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NB. The Intelligence contained in the present Bulletin has been taken exclusively from the local periodicals, bulletins, and other publications which have reached the Library of the International Institute of Agriculture in Rome during the months of December 1912 and January 1913.

The Bureau assumes no responsibility with regard to the opinions and the results of experiments outlined in the Bulletin.

The Editor's notes are marked (Ed.).

FIRST PART.

ORIGINAL ARTICLES

The Present Condition of Citrus Growing in Spain

by

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According to the latest official figures, which are fairly accurate, e are in Spain 117 459 acres under oranges and 6363 acres under ns. Other citrus fruits are not grown to any extent, and probably acres would cover the area under limes and citrons; further, these hardly ever grown alone, but are planted in small numbers among ges and lemons.

The production of fruit in 1910 was 782 200 English tons of oranges 623 250 tons of lemons.

THE CHIEF ORANGE-GROWING REGIONS OF SPAIN.

The principal orange-producing centres in Spain are the renowned ining provinces of Valencia and Castellón, the province of Murcia the province of Seville: these represent three distinct regions.

In the *first* region sweet oranges, particularly Valentian, Imperial, Tangerines, are almost exclusively grown: these are in demand he English market and for consumption in Madrid. There are many r varieties, in particular blood oranges, which are much in demand Germany owing to their good keeping qualities.

Orange growing has long been carried on in this region along the coast in the lower valleys of the rivers, where frosts are quite exceptional. as now extended up the lower slopes and first plateaus of the neighring mountains, but the crop is here not quite certain. The soil in the ge groves on the low ground is clayey in Castellón and lighter in encia, but always deep; out of the valleys the cultivable soil is poor can only support oranges when carefully improved. This region also udes the groves in the provinces of Tarragona and Alicante, which oin it on the north and south respectively. Most of the oranges

exported and consumed in the centre and north of Spain are gro in this region. Of the 120 000 acres in Spain, nearly 100 000 belong h and of these some 850 000 are in the two provinces of Valencia and C tellón. The chief centres of production are Alcira and Carcagente in t wide valley of the Jucar, and Burriana and Villareal in the Mijares val The sub-region of the Balearic islands may be put with this region, b its production is declining and of little importance.

The density and even distribution of the population and the care work of the men who attend to the trees and gather the crop are fa tors no less favourable than the climate to the good results of oran growing.

The principal orange-groves in the *province of Murcia* are abo Murcia itself and in the lower valleys of the Segura and the Vinalopó. Th meteorological conditions are much the same as in the first region. Th soils of the Murcia and Segura valleys are mostly more siliceous, an are very well suited for lemons, largely grown in this region, and lime These two crops, which cover nearly as large an area as the various va ieties of oranges, give sweet and exquisite fruit, which does not ke very well.

The distance from the ports has been the chief reason why thes crops have not developed as well as in the Valencia region.

The eastern provinces of Andalusia may be included in this secon region, with which indeed they are already connected geographically Almeria and Malaga each grow some 1750 or 2000 acres and Granada abo half this area. The valley of the Almanzora and the maritime and centra parts of Granada and Malaga are the only areas in which this cultivation leaves the coast and extends to the sheltered slopes of the sierra of th Alpujarra. The soils are formed of transported material and are ver fertile owing to the weathering and transportation of the parent Silurian slates.

The commonest varieties are the Chinese orange, the Malta blood orange, the Grano de oro and Tangerines ; the fruit is sweet and of good quality. Bitter oranges are also grown in Malaga and limes in Granada and Almeria.

A good number of cases of oranges are exported to England from thi region. The home market takes the lemons and limes at good prices

Near the limits of this zone, especially in Granada, orange growing is somewhat neglected, so that the trees often suffer from gummosis As the dead trees are not replaced, the yield is diminishing ; it was, how ever, never more than sufficient for local needs.

The *third* comparatively important region is that of *Western Andalusia*, whose centre is the province of Seville with over 3500 acres of groves. Here the climate is less favourable, owing to the cold winters which are general. The chief districts are Seville, Mairena, Carmona and Dos Hermanas. By the valley of the Guadalquivir this important region communicates with the sub-region of Cordova, where it reaches its northern limit on the sheltered slopes of the cordillera of the Morena.

ith this region are also connected the groves in the provinces of
nd Huelva, all on deep and fertile alluvium. The development
d by oranges in this region is generally greater than in Valencia.
oranges do best, as their flowers can stand cold; on and near the
mes do pretty well, and those from Conil are celebrated. Many
arieties, both red and yellow fleshed, grow in the gardens and groves
the ones mentioned.

e cultivation is lucrative here, for the production is somewhat
he consumption and leaves room for export. The oranges picked
mn are sent away, while those that hang all through the winter
t more or less damaged by frost are sold locally at prices up to
r cwt. ($2.20 per 100 lbs.).

ck of care, particularly as to manuring and pruning, has led to the
ecoming infested with all the diseases which have recently ap-

some of the remaining provinces, such as Barcelona in the north-
adajoz and Cáceres in the south-west and Pontevedra and Co-
n the north-west, oranges are grown on a small scale in sheltered
or close to the sea.

e cultivation of citrus trees is not everywhere equally careful.
respect the east coast (Valencia) region may be taken as a model.
rking of the ground is generally satisfactory, except that trenching
sually carried out before starting a grove: this is due to lack of
omical implement for the purpose.

nuring is copious, but the formulæ used are not always sound.
on leaves nothing to be desired, as in this region it has long been
d.

this region the picking begins in early November for Imperials
ngerines. Some fruits are picked first rather green to relieve
and encourage the ripening of the rest; a second picking is carried
January and February, and the late fruits are picked dead ripe
pril. In the province of Valencia there is also a small second crop
the end of summer — the result of a late and more or less irreg-
ond flowering.

the Andalusian region the cultivation is much less careful: the
is almost always insufficient, and the neglect of pruning is shown
angled crowns of the trees. For this reason the trees have suffer-
y from diseases.

list of pests which infest all our orange-groves with greater
intensity is large; the following are the most important: *Chry-
us dictyospermi* Mask. ("piojo rojo"), *Mytilaspis citricola* Pack
ta"), *Dactylopius citri* Risso ("cochinilla algodonosa"), and
us hederae Vallot ("piojo" or "cochinilla blancos").

first of these is the most important, owing to its prevalence
damage it does; the agricultural associations and Governement
rs have organized a campaign against this scale: this campaign
o be effective as soon as hydrocyanic acid fumigation was taken

up and the worst attacked provinces were provided with the nec staff and appliances for the work. The Committee of "ingenieros nomos" to whom the work was entrusted has now 32 tents and a cient staff of trained men.

Economics of Orange Growing.

The figures given above for the area and yield of citrus fru Spain, which show what great importance these crops now have f country, have been reached in a short period, for in 1870 the prod was only one-third of what it is at present.

The upward movement, which was due to the demand on the E market and the extraordinary development of sea-transport, ke increasing in the last decades of last century. In the east coast r particularly in Valencia and Castellón, the groves increased ver pidly. In Alcira, Játiba, Carcagente, Villareal, Almanzora, Bu and many other districts they increased four- or five-fold in a few Very poor land was brought under cultivation at considerable ex for improvements, including drainage or irrigation. This great sion slowed down considerably towards the close of the century, partly to economic conditions becoming less and less favourable t superabundant production.

The accompanying table gives the figures for exports for the 1901-1910.

Year	Quantity exported		Value of exports	
	Oranges	Lemons	Oranges	Lem
	tons	tons	£*	£
1901	280 831	3 354	1 698 438	4
1902	362 569	3 189	2 197 617	3
1903	389 324	3 017	2 354 593	3
1904	402 569	4 040	3 353 571	4
1905	308 655	2 437	1 866 706	2
1906	386 505	2 072	2 337 541	2
1907	461 886	2 814	2 793 438	3
1908	458 876	4 088	3 172 090	4
1909	453 888	3 084	2 147 673	3
1910	489 354	3 188	2 367 652	3

* Calculated at 25.20 pesetas to £ 1.

ere has been an increase all along, except for irregularities due to on in the crop. So far no serious difficulty in disposing of the prod- is been experienced.

ie value of the exports seems to have changed very little during ade. If the customs figures are to be credited, there was no great on from the mean price (5*s.* 6*d.* to 6*s.* per cwt., or $1.22 to 1.30 0 lbs.) except in the years 1904 and 1908, when it was exceeded, 09 and 1910, when the price was as low as 4*s.* 10*d.* per cwt. ($1.05) lbs.). From the above figures the changes in price are not very but considering that other reliable figures (1) for 1902 fix the price nges at 4*s.* 10½*d.*, it may be taken that the change has not nfavourable to the production, considering that in the last few years vering of price has been compensated by the rise in the value of h currency on exchange.

in these prices be considered paying for the grower?

. Sanz Bremon, in his work "Riqueza agricola de la provincia de ia," calculates the average yield of an orange grove in full bearing lbs. per tree and 18 000 lbs. per acre. The annual expenses, in- interest on capital and the writing off of the expenses incurred the trees come into bearing, amount to £15 ($73) per acre. Taking it fallen and consumed at home as one quarter, and reckoning s. 7*d.* per cwt. (35 cents per 100 lbs.), and accepting the figures by the Commission on inland customs duties, the annual production re may be taken as follows:

lbs. of oranges at 4*s.* 10½*d.* per cwt. ($1.06 per 100 lbs.) .	£29 7*s* 6*d* ($143.10)
lbs. of oranges at 1*s.* 7*d.* per cwt. (35c. per 100 lbs.) . . .	£ 3 3*s* 8*d* ($ 15.75)
Total . . .	£32 11*s* 2*d* ($158.85)

here is thus a net gain of about £17 10*s.* ($86) per acre, quite a sat- ry result. In the other orange-producing provinces the conditions nerally no less favourable. While there is no other region in which oduction is so considerable (the average for the whole of Spain not above 13 500 lbs. per acre) or so valuable, yet elsewhere the cost duction is generally less owing to the lower value of the land and eaper labour, as in the Andulusian provinces.

he condition of citrus growing would be better if both the yield he means of disposing of it were always in a normal state. But to complex circumstances, this desirable situation is frequently ained. At numerous places in the east coast region, particularly province of Castellón, the groves have been established on un- e soil, necessitating heavy expense for its improvement. To ob-

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See: *Actas y trabajos de la Comision extraparlamentaria de consumos*, "*Estado 45*". (*Author's note*).

tain water, for instance, wells had to be bored through rocky beds, such cases the costs of forming the grove entail a much heavier ch on the annual expenses, and the yield generally does not equal that the valley groves.

In many places, certain factors of more or less constant and ge action, such as the steady rise in rents of land and the new disea have an unfavourable influence on the economics of production. Ag while so far the disposal of the produce has always been possible, it is less easy than formerly, and the characteristic difficulties of o production are beginning to be felt.

The commercial organization, with its sales ill-regulated, its forw ings badly distributed and poorly graded, and the frauds of its m polizers, tends to depreciate the produce and combines with the alre existing causes to produce a distinct state of uneasiness, which is con ered by some as a veritable crisis in Valencian citrus growing.

It should be remarked that in the other orange-growing distr the conditions of the market continue to be highly favourable; ind in the east coast region itself, Murcia and Alicante continue to incr the number of their plantations and the size of their export figures, the growers make no such complaints as do those in Valencia and (tellón. It is evident that the over-production is confined to these provinces.

My idea is that the facts just mentioned give evidence of a mark but not irremediable, crisis. The farmers' association is develop rapidly in the most affected provinces, and the organization of sales exportation will easily be accomplished by the cooperative socie now in progress of formation, and the Government seems inclined to courage the movement. The control of orange pests is already efficacio thanks to the generalization of the hydrocyanic acid method. If th improvements can be further added to by measures for putting an to the disorder of the new and generally badly situated plantatio orange growing in Spain will recover its former prosperity. Further, development of the utilization of the secondary products (orange flow citric acid, bark), still in its infancy, will furnish a new source of pro which the associations will find it easy to exploit.

It is evident that for this crop, as for all others, the future is uncertai and a constant watch must be kept on competition so as to see how b to override it. For many years Spain has had to compete with old European countries. In other parts of the world thousands of acres oranges and other citrus trees are being planted every year. This fut competition (to which indeed all other European crops are subject) m be provided against by perfecting methods, continually adapting th to local requirements and turning out the type of fruit liked by the co sumers.

Calf Rearing on the Emulsion System, with Coconut Butter as Cream Substitute.

by

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ith the rising prices of milk and the better methods of turning the ıpplies to account, it is natural that an attempt should be made -rearers to discover effectual substitutes for this substance. Many, most, of these substitutes have proved useless and do not replace at all a satisfactory manner. Although a certain measure of suc- n be obtained by giving a calf milk only for a short time after its ınd rearing it subsequently with the assistance of every possible rovided the greatest care and a certain amount of money is expen- et the results are not wholly as satisfactory as if the young animal en supplied for a longer time with milk, even if skim milk is grad- ubstituted for whole milk. According to this method, a heifer uld be given milk for about 5 months, *viz.* whole milk for 2 months, ing gradually replaced by skim milk during 2 months, and skim ing fed alone for the last month. In the case of a bull calf, milk ı for 8 months: whole milk for 2½ months, a mixture of whole ıd skim milk for 4 months and skim milk alone for 1½ month. iding principle is never to give the calf a large quantity of milk, give it over a considerable period. The expense entailed is not nd the result far more satisfactory than if a large quantity is given and soon discontinued. The result of the last-mentioned system oduce a fat animal at first, *i. e.* one that has a large amount of re- ubstances, which are of little use to a calf. On the contrary, over-feeding is continued throughout most of the rearing period, ult is a direct decrease in the milk yield. When the milk rations nd the calf is fed on non-fatty substances, it loses the fat it put on ed on milk and becomes pot-bellied (*Heu-bauch*). The aim of the in rational feeding is to supply the young beast with such food enable it to use all its energy for the purpose of its perfect devel- ; or in other words, the growing power of an animal must be con- brought into play by means of its food, so that its growth gets ck.

1905, at the Dairy Congress in Paris, the writer became acquain- th the system in vogue in France of replacing milk fat by another

animal fat in calf-rearing and fattening. Encouraged by the s
of the method, he made experiments in the same direction. In
to ensure satisfactory results and to obtain as much difference i
as possible between milk fat and its substitute, he selected for the
a vegetable fat, namely that obtained from coconut; this fat ha
been used for cooking purposes as a butter substitute. The ch
fats are those obtained from plants. Coconut fat also contains 9
cent. pure fat, which is not usually the case with other similar subst
adulteration is so far out of the question, as no cheaper raw subst
can be found. By mixing 35 grams in about 1 litre of skim milk, a
with 3½ per cent. of fat was obtained, *i. e.* one corresponding t
average milk used in rearing, for it is of no special advantage to
calves milk which is extra rich in fat.

In order to make a suitable mixture, the fat and skim milk are h
to 60° C. and passed through an emulsion drum. Emulsion mac
of this kind are supplied by the firm of E. Bazzi and Co. (Engi
of 4 Viale Venezia, Milan, Italy, and Messrs. R. A Lister and Co.,
ley, England. The object of both these machines is to obtain a mi
of skim milk and of melted plant fat suitable for feeding; the
ture must not be allowed to stand, but should be made fresh each
as the fat rises like that of whole milk, and thus each calf does not re
the necessary proportion of fat and skim milk. It is not possible to
the plant fat and skim milk with a hand apparatus, and all atte
which have been made to do this have proved unsuccessful. It
been shown by experience that the use of so-called emulsion-milk is
under certain circumstances, to cause scour; but this can be large
avoided by pasteurizing the skim milk.

The feeding is done according to the accompanying tables (pp.
and 170).

These tables are taken from "Leitfaden der Wartung und Pfleg
Milchviehes" by Dr. Paul Schuppli, published by Messrs. Parey, Ber

The calves are usually fed three times a day for the first few d
After a week, this is gradually reduced to twice, so that the daily am
given in the tables is fed in two portions, early in the morning and in
evening. It should be mentioned that the calves are given hay v
they are a week old, but no water till the daily ration of emulsion and
milk begins to decrease, and then 1¼quart of water is substituted
every quart of milk which is withheld; it is however always given
the dry food, instead of before, as was the case with the emulsion
When the calf is 8 weeks old, it is given oats and wheat bran; the m
for the heifer calf is 1 lb. each of oats and wheat bran, until the mi
withheld altogether; while for bull calves, the amount is 3 lbs. of the
together. Towards the end of the first year, this ration is gradually
sened and finally ceases in the case of the heifer calf, but the bull
is given oats and bran for over a year. The best food for the heifer
is not one which influences milk production, for it is only the first s
of development which should be taken into consideration.

TABLE I.

Bull Calf.

Quarts *) per day				Total amount (gallons)			
Milk from its dam	Whole milk	Emulsion milk	Skim milk	Milk from its dam	Whole milk	Emulsion milk	Skim milk
6	—	—	—	13 1/4	—	—	—
—	7	—	—	—	10 3/4	—	—
—	7	1	—	—	3	1/2	—
—	6	2	—	—	2 3/4	1	—
—	5	3	—	—	2 1/4	1 1/4	—
—	4	4	—	—	1 3/4	1 3/4	—
—	3	5	—	—	1 1/4	2 1/4	—
—	2	6	—	—	1	2 3/4	—
—	1	7	—	—	1/2	3	—
—	—	9	—	—	—	27 3/4	—
—	—	10	—	—	—	61 1/2	—
—	—	8	2	—	—	61 1/2	15 1/2
—	—	7	3	—	—	21 1/2	9 1/4
—	—	5	4	—	—	15 1/2	12 1/4
—	—	3	5		—	9 1/4	15 1/2
—	—	2	6	—	—	6 1/4	18 1/2
—	—	—	8	—	—	—	24 1/2
—	—	—	6	—	—	—	27 3/4
—	—	—	4	—	—	—	18 1/2
		Total . . .		13 1/4	23	215 1/2	141 3/4

In this part of the table the litre is taken as equal to the quart, so as to avoid fractions; in the exact amounts given by the author, subtract one-eighth from the figures: thus 1 becomes 8 3/8, and 8 becomes 7.

e following table gives the results which have so far been obtained lves reared on emulsion milk at the Grabnerhof School of Alpine ny from 1905 to September 1912.

	Number —	Average increase per calf per day lbs.
Murboden heifer calves	90	1.63
Murboden bull and steer calves	78	2.05
Pinzgau heifer claves	44	1.70
Pinzgau bull and steer calves	46	1.91
Total number of calves	258	1.82

TABLE II.

Heifer Calf.

No. of Days	Quarts *) per day				Total amount (gallons)		
	Milk from its dam	Whole milk	Emulsion milk	Skim milk	Milk from its dam	Whole milk	Emulsion milk
10	5	—	—	—	11	—	—
7	—	6	—	—	—	9 ¼	—
2	—	6	1	—	—	2 ¾	½
2	—	5	2	—	—	2 ¼	1
2	—	4	3	—	—	1 ¾	1 ¼
2	—	3	4	—	—	1 ¼	1 ¾
2	—	2	5	—	—	1	2 ¼
2	—	2	6	—	—	1	2 ¾
2	—	1	7	—	—	½	3
14	—	—	8	—	—	—	24 ½
14	—	—	6	2	—	—	18 ½
14	—	—	5	3	—	—	15 ½
14	—	—	3	5	—	—	9 ¼
14	—	—	2	6	—	—	6 ¼
14	—	—	—	8	—	—	—
14	—	—	—	6	—	—	—
14	—	—	—	4	—	—	—
7	—	—	—	2	—	—	—
150			Total . . .		11	19 ½	86 ¼

*) See note under preceding table.

They were, as is seen, relatively satisfactory: not much more be required for producing cows of good performance which are he and possess good powers of resistance.

Stress should be laid on the fact, that a hardening system was ca out simultaneously with the prescribed method of rearing. Conseq ly, the growth of the animals was less in proportion than if they had stable-reared, but the often greatly increased growth which sometl occurred in spite of similar feeding is thus explained. When they fortnight old, the calves are taken every day in winter to the exerc ground, which has a sunny aspect but no special shelter; in sum they are turned into a pasture, where they at once begin accusto themselves to a grass diet. Of course, they are still fed in the sh

e and the same amount of bulky food is given till they are able to
n sufficient grass, when of their own accord they refuse the corres-
ng amount of dry fodder. In this way, the grazing period is got
without scouring or much loss of weight. The only precaution that
en in bad weather consists in rubbing down the very young calves
straw as soon as they return to the shed, to prevent chill.
'he chief advantage in emulsion feeding is that the same results
btained as with a mixture of whole and skim milk and at far less

)f this the figures in Table IV (next page) give the best proof.

Remarks on Table IV.

1) The price of whole milk is taken at 18 heller per litre (8¼ *d.* per gallon)
xcount of the general rise in the price of milk.
2) The cost of preparing 25 gallons of emulsion milk is reckoned as follows:

	s	*d*
gallons of skim milk at 2¼*d.*	4	7
2 quarts lacking are made up by the coconut fat, of which 8 ¾ lbs. will ike the total up to 25 gallons).		
lbs. of coconut fat at 6¼*d.* per lb. (including carriage and preparation)	4	6 ¾
of preparing 25 gallons of emulsion milk (including depreciation on machine)		3
of 25 gallons of emulsion milk	9	4 ¾
erefore one gallon will cost 4½*d.*		

3) A fifteen years' average at the Grabnerhof School of Alpine Economy gave 207 ding days and 158 grazing days. The costs of the stall-feeding and grazing days for nd bull calves are based on the experience obtained there.
4) The straw requirement is sma.ll, owing to the shortness of the stalls and the depth drainage gutter: the amount allowed is enough for calves up to a year old.
5) A man who milks 16 cows receives:

	£	*s*	*d*
: per month 26*s.* 8*d.*, or per year	16	0	0
nd lodging: per month 23*s.* 4*d.*; per year	14	0	0
Total	30	0	0
tention for one cow therefore comes to	1	17	6
ing one-third for a calf		12	6

6) The cost of stabling for one cow (including food rooms, manure pit
ter troughs) comes to about 33 6 8
terest at 4 % and upkeep at 2 %, the cost per cow per year will be 2 0 0
ing one-third for a calf 13 4
7) Light and veterinary expenses are reckoned for a cow at 5 0
alf 1 8
8) The management of breeding must certainly be included in the cost of rearing, assumption that every breeder will incur certain expenses for the useful purposes of nance tests and selection of stock, and will also pay a subscription to his Association.
9) The value of the dung is estimated according to the amount produced, and it is as- that there is a suitable pit for storing it.

n these rearing expenses the value of the calf is not included, as this ds on its breed, descent, etc., and is therefore very variable, as is

TABLE IV.

Substance	Unit price	For a Heifer Calf				For a Bull Calf			
		Reared on whole milk, and some skim milk		Reared on whole milk, emulsion milk, and skim milk		Reared on whole milk, and some skim milk		Reared on whole milk, emulsion milk and skim milk	
		Quantity		Quantity		Quantity		Quantity	
			£ s. d.		£ s. d.		£ s. d.		£ s. d.
Whole milk	1 gallon — 8 ¼	166 gall.	5 13 5	30 gall.	1 0 8½	333 gall.	11 6 9½	36 gall.	1 4 9
Emulsion milk	1 gallon — 4 ½	—	—	72 gall.	1 7 5	—	—	215 gall.	4 1 8
Skim milk	1 gallon — 2 ¼	80 gall.	— 15 2	108 gall.	1 0 5	149 gall.	1 8 0	141 gall.	1 6 10
Oats	1 cwt. 8 6	220 lbs.	— 16 8	220 lbs.	— 16 8	264 lbs.	1 0 0	264 lbs.	1 0 0
Wheat bran	1 cwt. 5 1	220 lbs.	— 10 0	220 lbs.	— 10 0	264 lbs.	— 12 0	264 lbs.	— 12 0
Salt	1 cwt. 5 11	2 ¼ lbs.	— — 1½	2 ¼ lbs.	— — 1½	2 ¼ lbs.	— — 1½	2 ¼ lbs.	— — 1½
Stall-feeding days	1 day { bull — 2 / heifer — 2 ¼	207 days	1 14 6	207 days	1 14 6	207 days	1 18 0	207 days	1 18 0
Grazing days	1 day { bull — 1 ½ / heifer — 1 ¼	158 days	— 15 9½	158 days	— 15 9½	158 days	— 18 5	158 days	— 18
Straw	—	—	— 4 2	—	— 4 2	—	— 4 2	—	— 4 2
Attendance	—	—	— 12 6	—	— 12 6	—	— 12 6	—	— 12 6
Rent of shed	—	—	— 13 4	—	— 13 4	—	— 13 4	—	— 13 4
Light and vet.	—	—	— 1 8	—	— 1 8	—	— 1 8	—	— 1 8
Breeding management	—	—	— 12 6	—	— 12 6	—	— 12 6	—	— 12 6
TOTAL	—	—	12 9 10	—	9 9 9½	—	19 7 6	—	13 6 0
To subtract for dung	—	—	1 9 2	—	1 9 2	—	1 13 4	—	1 13 4

he danger of loss. The expenses must be understood to refer to f that is safely reared.

he difference in cost between rearing calves on whole and skim compared with the expense of using emulsion milk as well as whole kim milk is, as the above table shows :

For a heifer calf	£3
For a bull calf	£6 1s. 6d.

hus the advantage is on the side of the emulsion-milk system, s the saving is very considerable, the trouble and labour entailed aking the emulsion milk is fully repaid.

t still remains to be shown that the final weight of cows reared on mulsion is not inferior to that of animals raised in the ordinary

There was no difference in the final weight of five-year-old Mur- and Pinzgau cows reared according to these two systems at Grab- f. The weight of 19 Murboden cows in 1906 averaged 1302 lbs.; in 43 cows averaged 1346 lbs., and amongst the latter were 12 animals had been reared on emulsion. Thus, in this case, the final weight increased rather than the reverse.

he emulsion system is certainly troublesome and requires great itude, but as the foregoing statements have shown, it is remuner- and much to be recommended. This has been proved by eight years' ience at Grabnerhof, and is corroborated by the experience gained ther estates.

Measures adopted in Sweden to spread Book-keeping among Farmers

by

M. L. NANNESON

Professor at the School of Agriculture at Hvilan, Sweden.

Up to recent years, when the measures adopted in Sweden to promote -keeping among farmers were discussed, the only one that could entioned was the instruction given in this subject in the higher and schools of agriculture. It is true that some associations of rural omy, among others that of the province of Malmöhus, had since published forms of book-keeping adapted to the requirements of l and medium farmers. But it was only with the introduction of s for small farms that book-keeping was more generally introduced. the last twenty years, every year and in each province an examina- is made of small properties (up to 30 acres) worked by their owners the most deserving are given rewards of which there are three classes

It was established in 1902 by the Statutes regulating these re that "the farmer who for his farm has received a prize in money not be awarded a second prize for the same farm unless he submi the Commission of prizes his notes drawn up according to the forms upon by the Direction of Agriculture, and collected by him since the at which the first prizes were distributed." Thanks to this meth obliging farmers who wish to compete for the State prizes for small fa ers to keep their books, a well regulated system of book-keeping penetrated very widely among the more advanced small farmers.

In the larger farms the Italian system of book-keeping by do entry is adopted almost without exception ; among medium sized fa it is also very frequent to find that book-keeping, at least by single en is practised ; but with the exception of the small farms that have b prizes, the practice of book-keeping has spread only to a trifling ex among small farmers. Nevertheless of late years it has been obse that the interest in book-keeping has increased in a most satisfac manner among Swedish farmers, and it may be added that the s and medium farmers have not been less keen than the others. For fact there are several reasons. Thus, the ever increasing intensity of fa ing has caused the need of control to be more sensibly felt. The sp of Control Associations (at the beginning of 1912 Sweden possessed wards of 700 associations for the control of dairies and in general als pig rearing concerns) has contributed a good deal to a better understa ing of the economic importance of agricultural book-keeping. Bes by *the law of* 1910, *which establishes taxation on capital and on inc* agricultural book-keeping has, to a certain extent, been rendered com sory in Sweden, as, according to this law, the net income of the f is the basis for taxation by the State, and as soon as the assessed v of an estate exceeds 25 000 crowns (£1357) the farmer must be prepare confirm the correctness of his individual declaration by his well-kept bo

Owing to the prominence thus given to this question, the campa to encourage book-keeping especially among small and medium fa ers has been carried on with renewed energy. Among the measu lately adopted in order to extend the movement among practical farm the following may be mentioned :

1. *The creation of agricultural book-keeping bureaus.* — In 1 and 1912 bureaus of agricultural book-keeping have been establis in several provinces by associations of rural economy and by other as ciations formed especially for the purpose. In order to explain the ganization of these bureaus the following extracts are given from the S tutes of the agricultural book-keeping association of the province of M möhus, which has its seat at Malmö (at present this association, wh numbers about 100 members possessing among them a total of 14 acres, is the most important) :

"The Association is organized as an economic association with ersonal liability, and a representative of the Society of rural econo the province has a seat on its committee.

'The book-keeping bureau established by the Association has the ing objects in view: keeping and closing complete farming accounts on the reports or yearly journals sent by farmers; auditing accounts; ig inventories; drawing up individual declarations; distributing for book-keeping; and compiling, from the material which it receives, ts of a certain importance for elucidating economic questions of al interest."

'As for the diffusion of book-keeping, this is divided into three ipal categories: A, simple agricultural book-keeping; B, more ex- d book-keeping, with special accounts for the various branches of rm; to which is added for C a detailed control of the returns of the us crops."

The subscription to be paid for the keeping of books is based on the spent for each member, and the minimum fee for closing accounts r the three types of book-keeping above mentioned, 20, 40 and 60 is (£1 1s. 8*d*., £2 3s. 4*d*. and £3 5s.) respectively. The sum to be for keeping the books has varied up to the present from 0.50 to 2 is per hectare of field (2½*d*. to 10½*d*. per acre) according to the size e farm and the more or less complete system of book-keeping.

This association works also in connection with the control associa- ; the assistants of the latter assist the farmers in keeping their cur- accounts, after which the control and closing operations are done e bureaus.

2. *The appropriations granted by the State and the Associations ral economy for the spread of the practice of book-keeping among small rs.* — According to a resolution voted by Parliament in 1911 a sum 000 crowns (£900) is granted every year for distribution among the farmers, who apply to the book-keeping bureaus approved by the and by the association of rural economy. This subsidy is paid e bureaus to which the farmers have entrusted the closing of their nts, and it amounts to 15 crowns (16s. 3½*d*.) during four years ach account closed in the course of the year, for farms not exceeding cres of arable land; it is given on condition that the interested as- tion of rural economy pays an equal sum.

3. *Special courses of book-keeping for farmers.* — Two years ago, e initiative of the associations of rural economy and of some private ns, a great number of courses of book-keeping were organized ghout the country for the benefit of farmers. These courses, which nly a few days, have generally been well attended. Further, instruc- in simple agricultural book-keeping is frequently a part of the pro- me of the complementary schools attached to the primary schools he country.

An active campaign is thus being carried on in several ways through- he country, with the object of spreading the practice of agricultural -keeping, and it is to be hoped that, with time, this work will be re- ed by success.

SECOND PART.

ABSTRACTS

AGRICULTURAL INTELLIGENCE

GENERAL INFORMATION.

– The Encouragement of Flax, Hemp and Olive Growing in Fra

Encouragements à la culture du Lin, de la Chanvre et de l'Olivier en France. – Jo
Officiel de la République Française, Year XLIV, No. 344, p. 10576. Paris, D
ber 18, 1912.

The law of April the 9th 1910 allots to cultivators of flax and h
from the commencement of the financial year of 1910 and for a pe
of six years, prizes to an annual amount (including expenses of veri
tion and control) not exceeding 2 500 000 fr. (£100 000), and which
be allotted, within the limits of this sum, in proportion to the exte
the areas sown, the minimum extent being 20 acres, the sum at no
exceeding about £1 per acre (60 fr. per ha.). The amount of this p
is fixed for the financial year of 1912 at £1 per acre.

By a ministerial decree of December the 16th 1912, the am
of the prize for the cultivation of the olive allotted by the law of
the 13th 1910 (1) is fixed for the financial year of 1912 at 5s. 6d. per
(17 fr. per ha.).

93 **– Regulations for Cattle Sales on a Large Scale in the La Vil
Market, Paris.**

Réglementation des ventes en gros sur le marché aux bestiaux de la Villette. – Jo
Officiel de la République française, Year XLIV, No. 344, pp. 10575-10576. Paris, D
ber 18, 1912.

By the decree of the 27th of June, 1912, a Commission was appoi
at the Ministry of Agriculture for the purpose of considering the am
ments to be introduced into the decree of the 22nd of January, 1
regarding sales on a large scale in the Paris markets, in order to en
cattle to be purchased at first hand in the market of La Villette.

The members of the Commission were nominated by a decree of
16th of December, 1912.

(1) See No. 2666, *B.* Aug.-Sept. 1911.

Horticulture in the Hungarian Budget for 1913. (Extract from the statement on the budget of the Royal Hungarian Ministry of Agriculture.).

artenbau, Obstbau und Baumzucht in dem Staatsvoranschlag für das Jahr 1913. — *olkswirtschaftliche Mitteilungen aus Ungarn*, Zur Orientierung des Auslandes herausgeben vom königl. ung. Handelsministerium, Year VII, Part X, pp. 1438-1444. Budapest, October 1912.

Under the head of personal expenses of class 26, chapter XX (horture) the following sums were allocated:

For 1912	£ 6 350
For 1913	£12 635
Increase for 1913 . . .	£ 6 285

Owing to the limited means at the disposal of agriculture for this pur-, the Minister of Agriculture has decided to rent fields near towns, strial establishments and watering-places, for the growth of vege-s and flowers, and to give spare time employment to children who to improve in horticulture, instead of costly lectureships, which will ture only be established in a few important places.

At the same time, coloured photographs of plants, fruits, etc., will repared, for the instruction of the children during the winter by means antern projections. These practical meetings willl be continued for ear or two by the ordinary agricultural staff, till the schoolmasters ther State employés have qualified for the continuation instruction he children.

Among temporary expenses, £1667 have been appropriated under heading: "for publishing market prices of horticultural produce, for the organization of sales of the same." This expenditure is amply ified by the state of the markets, which clearly show the lack of in-nation concerning buying and selling.

To remedy this state of affairs in the future, an organization will created under the Ministry of Agriculture, consisting of employés his department, reporters and persons who have gained some State ificate in horticulture; by means of this, the trade will be able to have rmation on the market prices of the whole country, and the central ion will have a sure foundation for the rational introduction and ex-sion of certain branches of production, while preventing its happening t the demands made by foreign countries cannot be acceded to owing ack of information as to the provenance of goods.

In connection with this question, the sale of the products must be to, especial care being taken that the small growers are not too much the mercy of middlemen. Small growers must be able to sell their ds to reliable salesmen, and must be instructed in grading and packing, realization of this double purpose is only attainable by material te assistance, for the necessery guarantees can only be obtained — il such time as commercial confidence in this organization is esta-d — by payments in hard cash,

The Royal Hungarian Ministry of Agriculture wishes to assist commercial enterprise by appointing packers, and by the grafting of trees by State agents in cases where obstacles to the activity of the ganization are formed by the lack of uniformity in the fruit trees. also wishes to bear the expenses of organizing fruit markets where grading and packing of the products purchased in advance are car out at the grower's.

For starting and helping market-gardens, £833 were voted in 1

The organization of such market-gardens was taken up by m municipalities, communes and corporations.

At the same time, to obtain greater and more lasting results, i necessary to support the production of the types of fruits whose mar value is increasing, and for this purpose existing centres of product should be encouraged and fresh ones started.

With regard to the improvement of quality, which necessitates creation of Experiment Stations, the State will undertake to bear con erable expense; it will also see to the formation of new central stati for proprietors can only start on market gardening when there are amples to follow and success is plainly evident.

The State should therefore organize the whole production by st ing undertakings cheaply, and arranging for their direction by com ent State officials who will teach the people.

For starting and assisting establishments for horticultural seed provement, the budget has allocated £833.

The production of agricultural seeds has been greatly encoura by the company for the "production of Hungarian agricultural seed which also undertakes the growing of some vegetable seeds. The tivity of this society, however, is directed only to exportation.

To do away with the disadvantages of getting the seed required home from abroad, the first thing would be to set up small establishme for seed-growing on plots surrounded by small farms. The results tained would be made known among the growers, who would then the selves take part in it.

The production of seed might be increased if the director of the ch trial station were to undertake the giving out of reliable information, a if the purchase of the seed grown were guaranteed in advance, as the b firms of seed merchants have declared they would be willing to do.

In spite of the favorable climatic conditions, which allow of ra ripening, and the conditions of the soil, which encourage quick mul plication, the growing of hyacinths and tulips and other bulbs is st very limited; steps are being taken to increase this branch.

For 1912 £6000 were allotted, and for 1913 £22 500; the increa of £16 500 is destined for new buildings, greenhouses, etc., in the esta lishments.

Growth and Usefulness of the Publication Work of the U. S. Department of Agriculture.

SON, JAMES (Secretary of Agriculture) in *Report of the Secretary of Agriculture*, 1912, 115-117 and *passim*. Washington, 1912.

cretary Wilson concludes his record of 16 years at the U. S. Dept of Agriculture; this period began in 1897 with a yearly farm tion worth $4 000 000 000 and ends with $9 532 000 000, and the roduced in 1912 has been the greatest in the history of the United

long with this increase, the number of persons employed by the ment grew from 2 444 in 1897 to 13 858 on July 1, 1912, and the riations for the department increased from $3 272 902 for the year ending June 30, 1898, to $24 743 045, for 1913. Secretary states that in wealth produced and conserved during these 16 the U. S. Department of Agriculture has returned more than ten these appropriations; and that the publication work of the depart- is an unerring indication of its growth and usefulness.

vidences of growth and usefulness. — The records of the Division blications, in which the publication work is centralized, show that 7 the mail requests for publications barely exceeded 500 letters eek, while during the past year, the weekly mail has exceeded letters, or more than 100 letters for each one received at the earte.

With a printing fund of $116 888, the different publications printed 7 were 424, and the editions aggregated 6 541 210 copies; in 1912, n appropriation of $470 000, the different publications were 2110, gating 34 678 557 copies.

he work of the Division of Publications reflects, and it is assumed always represent, the activity of the other offices of the depart-

All the information acquired in the several bureaus by the means ir command finds its expression necessarily in the form of publica- which pass through this office. Every enlargement of the scope work covered by any other office, especially the adoption of en- new lines of work, involves an addition to the work of the Division blications.

The appropriations for the fiscal year 1897 disbursed by this divi- for salaries, supplies, etc., amounted to $44 367, while for 1912 they $209 960, an increase of nearly 475 per cent. In 1897, the number ployees in the division was 61, and in 1912 aggregated 197, an in- e of nearly 225 per cent.

Number of copies distributed. — During the 1897-1912 period over 00 000 copies of publications have been distributed to those engaged terested in farming. Of this number slightly more than 88 000 000 s were Farmers' Bulletins. Although the series of Farmers' Bulle- was begun in 1889, only about 5 000 000 copies had been issued by , and those distributed during that year amounted to less tha 000 copies, while during the year 1912 over 10 000 000 copies w

distributed. Previous to the period under discussion only 41 dis Farmers' Bulletins had been prepared, and at present there ar separate pamphlets discussing nearly every phase of modern agricu operations.

It is stated that no other Government issues as many publica as does the United States, and that no executive department of the Government issues as many publications as does the U. S. Depart of Agriculture in performing its function of acquiring and dissemin useful information in regard to agriculture. But the rapid inc in the population of the country and the great popularity acquire the documents of the U. S. Department of Agriculture have so augme the demand that the department has not in recent years had an app riation that permitted the printing of a sufficient number of copies to the demand.

The U. S. Congress, however, has provided a solution of the p lem by authorizing the Superintendent of public documents to re and sell at a nominal price such documents as may be required. enormous increase in the sale, by that official, of the U. S. Depart of Agriculture publications is surprising when it is remembered millions of copies are distributed free, both by the Department of culture and by Members of Congress. During the last fiscal year 17 copies were sold by the superintendent of public documents, for w he received $16 428.

The magnitude of the work of disseminating the vast fund of in mation so systematically sought and so scientifically verified is comm surate with the enormous advance made in the application of scien knowledge to practical agriculture of the United States — a result to w the U. S. Department of Agriculture has contributed no small sh The improved conditions on farms, the increased yields of crops, the proved breeds of live stock, and the new varieties of fruits result from the labors of the U. S. Department of Agriculture as detailed explained in its publications have added many millions to the we of the American Nation.

96 - Yellow Fever and Mosquitos.

HOWLETT, F. M. in *The Agricultural Journal of India*, Vol. VII, Part IV, pp. 369 Calcutta-London, 1912.

India has so far been immune from yellow fever; but there is alw the possibility of its introduction. The probability that the disea once introduced would spread with any rapidity depends on the pres of certain mosquitos.

The organism which causes the fever is so minute that it has not been possible to isolate it, but it is known that the disease is propaga from a patient suffering from yellow fever to a healthy person by bite of a mosquito known as *Stegomyia fasciata*. It is a "domesti mosquito, and is generally found in or near human dwelling places, w breeds in almost any small casual accumulation of water (such as

ns, broken pots, the cut ends of bamboos, etc.). Unfortunately
it yet known whether the other species of the genus *Stegomyia* are
ss or whether they must be regarded as dangerous. Judging by
y with the case of *Anopheles* mosquitos and malaria, it seems
kely that some or all of the other species of *Stegomyia* might be
capable of carrying yellow fever.

the large Indian sea-ports, and particularly in Bombay and Cal-
S. fasciata is a common insect. On the other hand, in the inland
s they are by no means abundant, and though widely distributed
re represented only by a few scattered individuals, while *S. scu-*
is very common.

evident from this that if yellow fever were introduced into the coun-
d *S. fasciata* were the only carrier, the disease would be limited to
ist districts and sea-ports; but if S. *scutellaris* is also a carrier it
spread infection all over the country.

ie distribution of the different species of *Stegomyia* in the larger
ts is now being ascertained with accuracy by a number of medical
, and this investigation has particularly in view the seasonal occur-
and normal breeding-places of *S. fasciata.*

scutellaris breeds mostly in the small accumulations of water in
t ends of bamboos, or in trees. The adult *Stegomyia* perish du-
e winter, while their eggs survive. These eggs are laid in water which
beginning of the dry weather soon evaporates, but the eggs live on
left dry, until the coming of rain and a proper temperature enable
to hatch. It is believed, though it is not yet wholly confirmed,
ellow fever can be conveyed by the offspring of an infected mos-
as well as by the parent itself. Therefore the plan advised by the
aims at destroying all the hibernating eggs, suppressing as far as
le the casual natural breeding places, and at the same time provid-
tificial ones in which at suitable times all the eggs and larvæ might
stroyed.

The Copra Itch.

— CASTELLANI, ALDO.: Note on Copra Itch.

— HIRST, STANLEY.: Report on the Mite causing Copra Itch. *The Journal of Tropical dicine and Hygiene*, Vol. XV, No. 24, pp. 374-375, 2 figs. London, December 16, 1912.

.— Already for some years past, the writer had observed that the
is working in the copra mills were affected by a peculiar eruption,
extended from the hands to the arms, legs, and trunk, but never
face. The eruption much resembles scabies in its external appear-
except that no burrows or cunicula are present. It is due to quite
erent parasite, which Mr. Stanley Hirst has named *Tyroglyphus*
r var. *castellanii*. This acarus was met with on the epidermis
patients and in the copra dust. It does not appear to make true
ws, but seems to induce dermatitis in the same manner as *Pedi-*
les ventricosus Newport, which lives in diseased cereals and produces
uption in persons handling the lat

The writer reproduced the disease experimentally. The ca
has very little or no tendency to heal spontaneously, unless the p
abstains for some time from his work in the copra mill. Beta-nap
ointment (5-10 per cent.) has proved a very useful remedy.

2, — Mr. Stanley Hirst gives a description and figures of the pa
in question and mentions that according to Michael ("*British T*
phidæ", Vol. 2, pp. 123-131) *T. longior* has a very wide distributi
Europe and is found on most kinds of dried or preserved animal an
getable matter, especially upon dried provisions.

**Experiments with Crude Carbolic Acid as a Larvicide in
Guiana.**

WISE, K. S., and MINETT, E. P. in: *The Journal of Tropical Medicine and*
Vol. 15, No. 23, pp. 358-359. London, December 2, 1912.

Floating larvicides, such as paraffin, either in its pure or
state, and even heavy petroleum oil, are practically useless in
Guiana for, owing to the strong wind always blowing, and the abs
flat open nature of the soil, such substances are quickly blown
to one side and evaporated before their asphyxiating properties
into play. In the case of large areas of water, such as drainage tre
many larvæ can be destroyed by keeping the water well stocked wi
small fish known locally as "Cockerbellies" and clearing away all
ing vegetation as far as possible, but these fish are often unable to
access to the many small depressions in the land holding temp
water. In these cases and under similar conditions in the labo
the writers experimented with crude carbolic acid, using the lar
Culex fatigans, *Stegomyia fasciata*, other Culicidae, *Taeniorhynchus*, *
albipes, and *C. argyrotarsus*. Under natural conditions, the larvæ in
of the small pits when treated with carbolic acid were seen to die in
an hour, but in the case of the pupæ the time was much longer, frequ
as much as 24 hours.

A dilution of 1 part of crude carbolic acid in 20 000 is compl
efficacious. Purified carbolic acid acts more rapidly, but is not efficac
in such high dilutions; further, it evaporates more quickly. The
treated in this manner is not harmful to animals, but they do not d
it readily on account of its tarry odour and blackish colour.

The writers have observed that, owing to its containing some
stituents insoluble in water, crude carbolic acid does not lend its
being sprayed over large areas with a Mackenzie spray, but by cons
ly stirring the mixture in a bucket during the process a fairly satisfac
distribution can be obtained.

When a large area of ground containing a number of small holes
as foot prints, has to be treated, it has been found more satisfactor
use substances which mix more easily with water, such as cyllin, cl
naphtholeum, or Sanitas okol, although the expense is much gre

ricultural Continuation Schools in Belgium.

d'Agronomie aux adultes. — *Ministère de l'Agriculture et des Travaux publics, Bul- e l'Agriculture et de l'Horticulture*, Year II, No. 4. Bruxelles, 1912.

ing the winter months 1912-13 agricultural continuation-school on will be imparted in 401 communes, and rural housekeeping will be held in 143.

y are distributed in the various provinces as follows :

Province	Communes with continuation schools	Communes with housekeeping courses
Antwerp	28	5
Brabant	45	13
West Flanders	78	7
East Flanders	50	31
Hennegau	47	11
Liége	33	3
Limburg	48	44
Luxemburg	40	23
Namur	32	46

the 190 teachers who conduct the boys' continuation schools, lementary school teachers and inspectors, 52 agricultural teach- énieurs-agronomes), 22 agricultural travelling lecturers (confé- agricoles), 29 professors and veterinary surgeons, 24 various , clergymen, etc.). The housekeeping courses are held by 35 achers, mostly teachers in housekeeping schools or travelling eping schools.

ntral Agricultural Shows in France in 1913.

relatif aux concours centraux agricoles en 1913. — *Feuille d'Informations du Mi- de l'Agriculture*, Year XVII, No. 51, p. 2. Paris, December 24, 1912.

the decree of December 18, 1912, the Minister of Agriculture has own his decision that 8 central agricultural shows shall be organized in the following towns : Antibes, Châteauroux, Epinal, Evreux, ontauban and Nantes. The Antibes competition will take place arch 10 to 16, 1913. The programme of this exhibition can be d by those interested from the Ministry of Agriculture and the es of the Mediterranean district. The dates of the other shows announced later.

cking Industries' Exhibition in Paris, July to October 1913.

sition d'Emballages à Paris, Juillet-Octobre 1913. — *La Petite Revue agricole et hor-* Year 19, No. 434, p. 6. Antibes, January 12, 1913.

om July to October 1913, there will be held at the Grand Palais Champs Elysées the first International Exhibition of packing and dustries, organized by the " Syndicat National et Mutuelle-Trans- ports."

For all further information, apply to the Administration, 2 Biscornet, Paris 12, or to the Commissariat général, Bourse de merce, N°. 63.

102 – Agricultural Shows in Great Britain in 1913.

Society holding Show.	Date	Pla
Shire Horse	25-28 February	Islington (La
Hackney Horse	4-7 March	»
Hunters' Improvement	11-13 March	»
Polo and Riding Pony	14-15 March	»
Bath and West and Southern Counties	27-31 May	Trur
Royal Counties	10-13 June	Windsor
International Horse Show	20 June - 1 July	Olympia (Lo
Royal Agricultural Society of England	1-5 July	Bristol
Highland and Agricultural Society of Scotland	8-11 July	Paisley
British Dairy Farmers	21-24 October	Islington (La
Birmingham Cattle and Poultry Show	29 Nov.-4 Dec.	Birmingha
Smithfield Club	8-12 December	Islington (La

103 – Horticultural Exposition at St. Petersburg.

Daily Consular and Trade Reports, 15th Year, No. 292, p. 1325. Washington, D ber 12, 1912.

Under the patronage of the Russian Department of Agricultu International Horticultural Exhibition will be held at St. Petersbu April 1913. The exhibition will consist of the following sections: F culture; decorative horticulture; hothouse plants and outdoor pl pomology; fresh and preserved fruits; vegetables; preservation an of fruit and vegetables; grains; bee-culture; silkworm culture; plants; scientific section; scholastic section; tools, instruments, an terial for horticulture; floral art and a commercial section.

104 – Stock-breeding Exhibitions Subsidized by the Government held in Uruguay in 1913-1914.

Fechas para la celebración de las Exposiciones subvencionadas por el Gobie *Revista de la Asociacion Rural del Uruguay*, Year XLI, No. 10, p. 785. Mont October 1912.

The Presidential Decree of September 10, 1912, has fixed the follo and places for the stock-breeding exhibitions, subsidized by

nent. Rural Societies have the power to organize non-subsidized
d shows.

Places where Exhibitions will be held	Date
Montevideo	Aug. 25, 1913
Salto	First Sunday in Sept. 1913
San Eugenio	2nd „ „ „ „
Rivera	3rd „ „ „ „
Melo	4th „ „ „ „
Paysandu	1st „ „ Oct. „
San Fructuoso	2nd „ „ „ „
Dolores	3rd „ „ „ „
San Rosa	4th „ „ „ „
Minas	1st „ „ Nov. „
Mercedes	2nd „ „ „ „
Fray Bentos	3rd „ „ „ „
Rolles	4th „ „ „ „
Pascano	1st „ „ Dec. „
Treinta y Tres	2nd „ „ „ „
Canadi del Yi	3rd „ „ „ „
Tranqueras	4th „ „ „ „
Carmen	2nd „ „ Feb. 1914
Nueva Helvecia	3rd „ „ „ „
Maldonado	4th „ „ „ „
Florida	1st „ „ March „
Puntas de Maciel	2nd „ „ „ „
San José	3rd „ „ „ „
Colonia	4th „ „ „ „
Durazno	1st „ „ April „
Rocha	2nd „ „ „ „

econd International Congress of Instruction in Household Manage nt at Gnent, Belgium, in June 1913.

Congrès international de l'Enseignement ménager à Gand, Belgique, en Juin 1913. *ume de Belgique. Exposition universelle de Gand* 1913. *Deuxième Congrès inter- nal de l'Enseignement ménager. Invitation.*

has been decided in conjunction with the International Office ruction in Household Management at Fribourg, Switzerland, e second International Congress of Instruction in Household ment shall be held at Ghent in 1913, during the Universal Exhib- owards the end of June.

ice of Secretary-General: 19, Rue Willems, Bruxelles.

hird International Congress of Farm Women at Ghent, June 12 15, 1913.

Congrès International des Cercles de Fermières à Gand, du 12 au 15 Juin 1913. *ume de Belgique. Exposition Universelle de Gand* 1913. *3me Congrès International Cercles de Fermières. Invitation.*

is only fifteen years, at the most, since the first farm women's tions were instituted in Canada and the United States. Since [illegible]

ago, they were established in Belgium and still more recently in Ita
Poland, Austria, Hungary and France, and the formation of simila
cieties is announced at an early date in Germany and Spain. The
International Congress of Farm Women was held at Colorado Spri
United States in 1911; the second at Lethbridge, Alberta, Canad
the third will take place at Ghent in 1913 during the Universal Exhib
from June 12 to 15. Secretary's Office: 38 Rue du Pépin, Brus

CROPS AND CULTIVATION.

107 – Electric Niagaras in Recent Thunderstorms. (1)

LAFOREST, M. A.: Les Niagaras électriques et les récents orages. — *Journal de la S
Nationale d'Horticulture de France*, 4th Series, Vol. XIII, pp. 572-574. Pari
tember 1912.

The electric niagaras which have been in use for eleven years in
department of Vienne are said by the inventors to have afforded comp
protection from hailstorms during that period. This statement, con
dicted by numerous inhabitants of those regions, was investigated
M. Turpain of Limoges in 1911; he reported that the instruments
of little value, and in the same year a building in Poitiers which
the apparatus was struck by lightning and set on fire. Notwithstan
this evidence, a powerful instrument was installed at the top of the
fel Tower, which was to afford protection to the whole of Paris;
during this last summer, on five distinct occasions that city experie
heavy hail and thunder storms, giving conclusive proof of the ineffic
of the electric niagaras.

108 – An Application of the New Pedological Knowledge to Grassl

SMITH, W. G. and CRAMPTON, C. B. The Influence of Origin and Topography on t
lands. — *British Association for the Advancement of Science. Dundee*: 1912. Su
M (Agriculture), *m* 13. London.

This is one of the first applications of the new pedological,
ecological, knowledge to agriculture in Great Britain.

The extent and distribution of grassland in each district of Br
depends much on the economic requirements, but the natural pro
tive capacity is primarily determined by the nature of the soil and v
tation resulting from the past and present influences of climate
topography, and the distribution of rocks. Extensive tracts of exis
grasslands have, under man's operations, replaced other types of v
tation, such as woodland, heath, moor and marsh. Such grassla
liable to change, since it is only a phase introduced into the histor
the vegetation. Other areas of grassland are of natural origin, and
main relatively constant under conditions which alter very slowly.

rasslands may be grouped into:

1) natural { *a*) stable
b) migratory according to its natural origin
2) artificially induced.

he area of stable grassland in Britain is limited, *e. g.*, chalk downs, xposed hills and bosses of limestones and basic igneous rocks. The tory types are widely distributed on alluvial areas and rain-washed along the river and coastal belts, and on the flanks of mountains. he changes which lead naturally to the evolution of grassland, and changes leading to its retrogression, are therefore factors to be spe- considered where maintenance or improvement of grasslands is w. It is suggested that these conditions, taken in conjunction with vations on experimental plots, may aid in correlating information ifferent types of grasslands.

he stable types of grassland apparently owe their existence to the e of the rocks and to the physiography, which limits the growth es and prevents leaching of the surface and stagnancy. Apart from table types there are the migratory types mentioned below:

a) Flushing of the slopes of moorland hills with water derived from springs, or with water bearing rain-wash, is favourable to the formation of grassland; this is specially veloped where the rocks are rich in lime or other bases, and where the flushing is tem- and periodic.

b) Recent deposits of alluvial clay loams in the higher parts of stream-courses support types of grassland.

c) Other types are formed on the alluvial clay loams of the flood plains in the lower f river courses.

d) Maritime types occur in succession to salt-marsh on coastal flats, and also on steep contours exposed to wind, salt spray and earth-creep, and where the nature of the prevents rapid leaching and the formation of heath.

he following conditions lead to the retrogression of grassland:

I. — In moorland districts, invasion by acid, humous, and ferru- s waters leads to deterioration, and in the case of alluvial sandy to the formation of pan and consequent stagnation and reversion oorland.

II. — Continued leaching by rainwater removes the soluble salts the upper layers of porous sandy loams and leads to production of

III. — Alluvial grasslands and those of moorland flushes deterio- by leaching when flooding is prevented; the low-lying clay loam al suffers mainly from insufficient drainage.

IV. — Accumulation of humus because of acidity or insufficient ig discourages the more valuable grasses.

V. — Grasslands may suffer depletion slowly through the contin- removal of wool and carcase.

109 – *Rate of Movement of Nitrates in the Soil.*

MALPEAUX, L. and LEFORT, G. (Ecole d'Agriculture du Pas-de-Calais). La circu des nitrates dans le sol. — *Annales de la Science Agronomique*, Year 29, No. 4, p 258. Paris, October 1912.

Six wooden boxes of 50 cm. cube were filled as follows :— 1) a with sand containing 13.5 % of water, 3), 4), 5) and 6) with a loam containing 16.8 % of water. Both soil and sand were tightly pa down. In 1) and 3) 10 gr. of calcium nitrate were put into a hol cm. in diam. × 3 cm. deep, in the middle of the box. In 2) and grams of sodium nitrate were similarly placed. 5) and 6) received pectively 20 gr. of calcium nitrate and 20 gr. of sodium nitrate in a small furrow 2 cm. deep and 40 cm. long running parallel to the side of the box and about 5 cm. away from it. This side, in the ca 5) and 6), was also perforated by three rows of holes at 5 cm., 10 and 15 cm. from the surface, the holes being 5 cm. apart in the r The holes were fitted with corks, and being 2 cm. in diam. allowed augur of 1.5 cm. diam. to be introduced for sampling. Though the b were kept in a place with little ventilation, in order to reduce evaporat it was found advisable to spray them with 2 litres of water each (eq to 0.31 in. of rain) after the experiment had been running 65 days. S ples were taken at 5 cm., 10 cm. and 15 cm. from the deposited nitr both in vertical and horizontal directions. The Grandval and Laf method was used for the analyses and the results are given in Tabl

Under the above conditions diffusion is evidently extremely sl even after four months the distribution of nitrate in the sampling is very unequal, the inequality being greater in the soil than in the s Vertical diffusion does not appear to be more rapid than lateral.

A second series of experiments was carried out in the field. A loamy soil was selected and a strip of land marked out into 10 squ each 75 cm. × 75 cm. In the centre of these a hole was made with iron peg and a charge of sodium nitrate introduced to the required de by means of a glass tube. The hole was then filled up again with ea

Plots	1 and 2 were controls.						
,,	3 and 4 received	100 gr. of nitrate at a depth of				1 m.	
,,	5 and 6	,,	75	,,	,,	,,	75 cm.
,,	7 and 8	,,	50	,,	,,	,,	50 ,,
,,	9 and 10	,,	25	,,	,,	,,	25 ,,

The surface of even-numbered squares was consolidated as far as sible, while the odd-numbered plots were hoed. Samples were t from the surface with an augur, 8 cm. deep and at a distance of 5 from the centre ; they yielded the results shown on p. 190.

Dates of Sampling	$Ca(NO_3)_2$			$NaNO_3$			$Ca(NO_3)_2$			$Ca(NO_3)_2$						$NaNO_3$								
	1			2			3			4						5			6					
	Horizontal diffusion			Horizontal diffusion			Horizontal diffusion			Horizontal diffusion			Vertical diffusion			Horizontal diffusion			Horizontal diffusion			Vertical diffusion		
	5 cm.	10 cm.	15 cm.	5 cm.	10 cm.	15 cm.	5 cm.	10 cm.	15 cm.	5 cm.	10 cm.	15 cm.	5 cm.	10 cm.	15 cm.	5 cm.	10 cm.	15 cm.	5 cm.	10 cm.	15 cm.	5 cm.	10 cm.	15 cm.
	*																							
May 20 (17 days)	150	1	1	50	1	1	135	4	5	33	8	5	—	—	—	120	4	4	28	5	4	—	—	—
June 15 (43 days)	350	30	5	385	20	5	362	15	6	50	10	5	25	7	5	400	25	5	60	10	6	20	7	5
July 1 (58 days)	180	50	7	228	28	5	187	26	10	39	11	5	26	5	5	200	35	5	38	8	6	23	5	5
July 11 (68 days)	105	54	8	124	28	8	116	46	7	24	10	8	—	—	—	150	42	6	26	13	5	—	—	—
July 24 (81 days)	85	51	10	110	36	10	106	40	5	19	11	6	38	13	5	123	44	6	22	15	8	29	14	8
August 15 (103 days)	95	44	8	83	54	5	100	44	8	20	17	10	47	11	9	110	40	9	26	18	11	35	15	10
August 29 (117 days)	79	60	9	70	63	7	115	55	9	38	21	12	51	12	10	100	30	10	32	20	13	35	32	13

(*) Nitrates are expressed in milligrams per 100 dry soil.

Plot		Nitrogen in milligrams per 100 dry soil			
		July 13 *	July 24	August 13	Aug
1 hoed	control.	5	7	6	
2 rolled		5	6	6	
3 hoed	1 m.	5	7	6	
4 rolled		5	6	7	
5 hoed	75 cm.	5	7	10	
6 rolled		5	10	13	
7 hoed	50 cm.	5	7	82	
8 rolled		6	8	90	
9 hoed	25 cm.	5	18	18	
10 rolled		5	30	27	

(*) Experiment begun on this day.
Total rainfall during experiment = 1.47 in.

Though the movement of nitrates by diffusion alone would to be a very slow process, the state of things is evidently very dif when they are caught up by the capillary current. In 31 days the n deposited at 50 cm. from the surface had reached the sampling or in other words had travelled over 40 cm., while by diffusion it would hardly have travelled over 4 cm.

Between August 25 and the end of October, 5.45 in. of rain fel on Oct. 25 fresh samples were taken every 10 cm. in depth to ex the distribution of nitrates as affected by the rain. The analyses are in Table III.

The rain had washed down the nitrates 20 to 30 cm. on the plots owing to their good absorbing surface, and there was a zone of imum nitrate content for each original depth of nitrate. On the plots there was a second zone of maximum nitrate content nearer t surface, corresponding to the limit of penetration of the rain. O whole the nitrates were at a higher level in the soil at the end of th son than at the beginning.

Practical conclusions. — When manuring beets, or other deep o which it is usual to apply heavy top dressings of ni

TABLE III.

Nitrates as Nitrogen in milligrams per 100 *dry soil.*

Depth	Controls		1 m.		75 cm.		50 cm.		25 cm.	
	Hoed	Rolled	Hoed	Rolled	Hoed	Rolled	Hoed	Rolled	Hoed	Rolled
	1	2	3	4	5	6	7	9	9	10
. . . . .	0.7	0.6	0.6	0.5	1.1	1.0	1.3	0.8	0.8	1.1
. . . . .	0.6	0.8	0.7	1.0	1.2	1.6	1.0	0.8	0.9	0.8
. . . . .	0.8	0.8	0.8	2.3	1.3	4.4	0.9	5.6	1.0	6.8
. . . . .	0.8	1.0	1.8	1.5	3.2	7.3	2.4	9.8	5.0	3.2
. . . . .	0.6	0.7	1.1	1.9	7.4	4.6	4.3	9.7	5.1	3.2
. . . . .	0.3	0.2	1.2	1.9	4.3	7.8	3.3	8.1	—	—
. . . . .	0.1	0.1	1.9	2.0	7.2	4.9	2.2	1.6	—	—
. . . . .	0.1	0.2	2.0	1.7	5.2	5.3	—	—	—	—
. . . . .	0.2	0.2	1.3	1.2	—	—	—	—	—	—
. . . . .	0.1	0.1	1.2	1.0	—	—	—	—	—	—

results would probably be obtained in many cases if the nitrate uried by an early ploughing or applied very early in the year, ry weather the nitrates must often remain quite at the surface t of reach of the roots. Should they be washed a little too far, ould probably be brought to the root region again in a short time.

ew Researches on the Accumulation of Nitrogen in the Soil by cro-organisms.

AK, J. Studien über die Stickstoffanhäufung im Boden durch Mikroorganismen der chemisch-phys. Versuchsstation der böhm. Sekt. des Landeskulturrates für Kgr. Böhmen an der k. k. böhm. Techn. Hochschule in Prag) — *Zeitschrift für das wirtschaftliche Versuchswesen in Oesterreich*, Year XV, Part 9, pp. 1077-1121 + + diagr. 3. Vienna, September 1912.

e writer considers the fixation of nitrogen in the soil by microms as one of the most important questions connected with plant tion. In three series of researches he investigates some of the prinactors of the phenomenon.

I. *Effect of some vegetable substances upon the assimilation activity* tobacter chroococcum *Beijer.* — It is well known that carbo- es supply assimilating bacteria with the necessary energy. Exating, in nutritive solutions, with some vegetable frequently come into contact with the soil and co

hydrates which may be utilized by bacteria, the following results obtained in comparison with glucose.

Vegetable substance	Carbon percent	Atmospheric Nitrogen assimilated. Mg. per 100 gr. of Carbon
Spruce needles	61.32	57.3
Oak leaves	55.24	89.5
Sycamore leaves	56.89	126.4
Maize leaves	49.03	280.3
Lucerne (green)	48.28	319.5
Wheat straw	51.04	325.4
Stubble	48.33	596.8
Lupins (green)	50.71	712.5
Clover (green)	49.67	1237.9
Glucose	39.97	1456.5

The chief conclusion to be drawn from these data is that the the vegetable matter, the richer it becomes in ligno-cellulose and quently less adapted as nutriment for the azotobacter. On the other green stuff, and in a lesser degree roots and straw, contain subs which are easily hydrolised into forms adapted to consumption b teria. There are further other micro-organisms in the soil which p nutritive material for azotobacter, and there is a whole series of en that render carbohydrates soluble.

2. *Effect of some energy-producing materials on the activity of organisms in the soil.* — Several samples of a beet soil were treate energy-producing materials, and the activity of the micro-organism determined as a function of the intensity of respiration measured b amount of carbon dioxide given off during 21 days.

Energy-producing materials	Carbon dioxide mg. average per 24 hours	Percent of Carbon transformed into Carbon dioxide
Soil	19.7	—
Soil + 10gr. carbon as glucose	755.4	42.14
" + " " " levulose	494.9	27.25
" + " " " starch	526.1	29.00
" + " " " cellulose	225.2	11.77
" + " " " oak leaves	328.7	17.70
" + " " " wheat straw	273.6	14.54
" + " " " clover (green)	1061.9	59.69

These determinations lead to the practically important result t of all the substances tried, green stuff is the best nutritive mediu the development of bacteria; in it they find, in favourable proporti carbohydrates and nitrogen; besides, the carbohydrates are in a fo more easily transformed by the enzymes contained

acteria themselves. Consequently green manuring increases the ty of bacteria, it causes a more intense respiration, it raises the rature of the soil, while the greater development of carbon dioxide rs the porosity of the soil and in union with water facilitates the egration of insoluble phosphates and silicates.

3. *Soil biological absorption.* — In the economy of fertilisers in the absorption phenomena play an important part:

a) physical absorption,
b) chemical ,,
c) biological ,,

The first two are fairly well known, not so the third, in virtue of which ubstances that constitute the food of plants are retained in an or-ed form by micro-organisms. The writer defines the biological ab-on of nitrogen as the difference between the amount of nitrogen bed by a sterilized soil and that absorbed by a non-sterilized one, s the quantity of nitrogen that is retained by the vegetative and assi-ing activity of the micro-organisms in the soil. The following data haracteristic: they were obtained by percolating during 30 days c. of decinormal solutions of ammonium sulphate, of sodium nitrate of calcium nitrate through 250 grams of soil:

Nature of the soil	Humus: per cent. dry matter	Nitrogen absorbed: per cent. of nitrogen in			Carbon dioxide given off in 21 days mg. per 1 kg. of soil
		ammonium sulphate	sodium nitrate	calcium nitrate	
loam, neutral-acid . . .	3.27	10.23	5.12	4.02	30.6
sandy loam, neutral . . .	2.20	14.10	7.60	6.30	42.5
clayey loam, slightly al-ine.	2.45	17.22	9.21	7.14	45.4
loam, acid	7.52	8.81	3.98	3.20	28.6
ow, sandy loam, acid . . .	2.05	5.62	2.20	1.83	25.2

Practical conclusions:

1. — The biological absorption of ammoniacal nitrogen is much intense than that of nitric nitrogen.

2. — In biological absorption the behaviour of sodium nitrate is lar to that of calcium nitrate.

3. — There is a connection between biological absorption and tion of the soil. The absorption of nitrogen is less reaction than with a neutral or alkaline one.

4. — The production of carbon dioxide is an index of the biol absorption of the various soils.

It thus remains demonstrated that biological absorption is an esse factor in the assimilation of inorganic nitrogen in the soil.

111 – The Action of Quicklime on the Soil.

HUTCHINSON, H. B. in *British Association for the Advancement of Science:* D 1912. Section M (Agriculture), *m* 5. London.

This paper gives an account of experiments designed to show l far the micro-organisms of the soil are affected by applications of qu lime.

The addition of small quantities of quicklime to field and gu soils stimulates general bacterial growth, but large quantities cause initial depression in the numbers of bacteria and the destruction of tain large protozoa, and a cessation of all biological processes. Con sion of the lime from the caustic form into the carbonate, or combinat with soil compounds, is followed by a great increase in the number bacteria and increased ammonification of soil compounds. The len of the period during which the bacterial growth is suspended would app to be determined by the quantity of lime applied, the initial reacti of the soil, and the amount of organic matter present.

Pot experiments have been carried out with variously limed s and the crop results show close agreement with those obtained by b teriological and chemical analyses.

112 – The Original Chemical Composition of Peruvian Guano.

El suelo y las plantas. IV. Composición del guano de la islas. — *La Riqueza Ag* Vol. I, No. 10, pp. 643-649. + figs. 6. Lima, October 1912.

From the report furnished to the " Compañia Administradora Guano " (3rd memoir) by the engineer, Sr. J. A. Lavalle Garcia, we ar possession of the following data respecting the original composition guano and the nature of the deposits of this substance which occur on islands off the coast of Peru.

The composition of Peruvian guano is very variable, and depe on the following factors:

a) The species of birds which produce it.
b) The geographical situation of the deposits.
c) The period of its formation.
d) The depth of the strata used.
e) The feather content.

Species of birds producing guano. — In spite of the resemblan he food and in the digestive system of the birds (1) which produce gua

(1) In the illustrations, the Alcatráz is a species of Pelican, the Guanay Piquero an Albatross. (*Ed.*).

nposition of their excrement is not identical, as might have been ed; this is shown by the following comparative table:

ical composition of the excrement of the chief guano-producing birds, per cent.:

	Alcatraz	Guanay	Piquero
er	14.57	18.95	5.58
tances insoluble in acids	0.39	0.47	2.48
	27.46	36.06	72.70
tances soluble in water	38.86	44.96	15.40
rine	0.54	0.10	0.35
rine reckoned as sodium chloride	0.89	0.17	0.58
l nitrogen	15.54	11.76	5.46
nic nitrogen	12.18	8.12	2.02
ioniacal nitrogen	3.22	3.50	3.30
ic nitrogen	0.14	0.14	0.14
phoric acid	10.15	13.10	5.75
sh	0.67	1.94	2.07
	9.16	13.16	7.20

ese data show the superiority of the guano from "guanais", which ıer confirmed by the nature of its nitrogen content:

	Alcatraz	Guanay
Organic nitrogen	78.38	69.05
Ammoniacal nitrogen	20.72	29.76
Nitric nitrogen	0.90	1.19
Total nitrogen	100.00	100.00

ıgraphical situation of the deposits. — The richness of guano in ı varies according to climatic conditions and consequently ac- to the geographical situation of the deposits; thus, the guano islands north of Callao is poorer in nitrogen and richer in phos- acid than that of the islands lying to the south, on account of the ainfall, which occasionally causes a loss of nitrogen. The respec- mounts are as follows:

		Nitrogen	Phosphoric acid
		per cent.	per cent.
Lobos Island	N. of Callao	10.80	27.69
Guañape „	N. of Callao	10.95	28.00
Macabi „	N. of Callao	10.90	72.60
Chinca „	S. of Callao	14.20	24.10

riod of formation. — As time goes on, the guano deposits become especially in nitrogen, either on account of the rain producing tation processes, lixiviation and volatilization, or wind, which removes the finest particles.

From experiments made at the Sugar-Cane Experiment S in Lima, it appears that the losses of nitrogen undergone by guan posed to the weather are as follows:

	After 10 days	After 30 days
Rich guano	10.44 %	11.94 %
Poor guano	8.00 %	8.00 %

Depth of the layers. — The nearer the layers are to the ground more pebbles and sand and the less active organic matter they con

Feather content. — The feathers in guano are from their nature in nitrogen; their average composition is as follows:

	Per cent.
Nitrogen	14.00
Phosphoric acid	2.64
Ash	7.84

In order to make the guano more homogeneous, the large fea are removed by means of sieves.

These data respecting the natural conditions of the guano dep reveal the very variable composition of this fertiliser, and assist i timating the differences in it; thus the amount of nitrogen, which i principal element in guano, utilized by the plants can be calcul

	Per cent. of total nitrogen
Organic nitrogen	55
Ammoniacal ,,	30
Nitric ,,	1

The total utilization is thus 86 per cent.; if the losses due to the ther are taken as 10 per cent., and those occasioned by leaching as cent., the total amount of nitrogen used by the plants would be cent.

113 – Philippine Guano.

Cox, Alvin, J.: *The Philippine Journal of Science*, Vol. VII, No. 3, pp. 195-199. 1912.

The phosphatic guanos of the Philippine Islands consist of th creta of sea fowl and other birds, bats and marine animals, with or less bone and animal matter furnished by dead bodies, and are in large quantities in some places, mainly on small islands and in num limestone caves. That from caves is usually bat excrement. Dep that also have been discovered on a great many of the islands, are Marinduque, Guimaras, Luzon and Mindoro. of the caves consist of one or more thousands of

bly as yet not over 1000 tons of guano have been mined in the whole pelago.

he writer summarizes in a table the results of 55 analyses of Phie guanos executed by the "Bureau of Science." The following he maxima and minima:

sture	Nitrogen	Nitrogen as Ammonia (NH_3)	Phosphoric Acid (P_2O_5)	Total potash (K_2O)
-68.45	0.10-8.81	0.22-9.93	1.4-23.12	trace-9.10

The Presence of Arsenic in Plants.

DIN, P. and ASTRUC, A. La présence de l'arsenic dans le règne végétal. — *Journal Pharmacie et de Chimie*, Year 104, Series 7, Vol. VI, No. 12, pp. 529-535. Paris, Dember 16, 1912.

t is known, especially owing to the researches of A. Gautier and G. and, that arsenic is normally present in animals; but until now, was known of the existence of this substance in plants.

he writers therefore undertook a series of experiments on the norccurrence of arsenic in the latter. They analysed more than 80 s, adopting the process employed by A. Gautier and modified by ertrand.

he analytic results for each plant are given in a long table from which ollowing figures, referring to the most common plants, are taken:

	Arsenic in mgr. per 100 gr.	
	Fresh material	Dry material
Orange (pulp)	0.011	0.099
Tangerine orange (pulp)	0.012	0.085
Haricot beans	0.010	0.012
Chickpeas	0.009	0.010
Lentils	0.010	0.012
Dried peas	0.026	0.030
Beans	0.020	0.086
Celery	0.020	0.232
Lettuce	0.023	0.387
Potatoes	0.008	0.031
Chestnuts	0.005	0.011
Hazelnuts	0.011	0.011
Walnuts	0.013	0.013
Bananas (pulp)	0.006	0.033
Dates	0.012	0.017
Asparagus	0.010	0.075
Rice	0.007	0.008
Maize	0.030	0.036
Barley	0.050	0.05
Oats	0.050	
Black truffles	0.020	

From the results obtained, the writers draw the following conclusi

a) It seems that arsenic is of general occurrence in plants and th fore this element must be of importance for the activity of the pr plasm.

b) Even parasitic plants, not in direct contact with the soil, c tain arsenic, which is indispensable for their proper development. I ther, there is no relation beteen the amount of arsenic in the para and that contained by the host plant.

c) From the arsenic content of any given plant, it is not possi to deduce accurately the amount present in plants belonging to the s botanical group.

d) In any individual plant, the green parts contain more ars than those which are not exposed to the light.

e) One of the sources of the arsenic normally prsesent in the gans of animals is the plants which have provided them with food.

115 - **Mode of Action of Weak Solutions of Electrolytes on Ge nation.**

MICHEELS, H. Mode d'action des solutions étendues d'électrolytes sur la germinatio *Bulletin de l'Académie Royale de Belgique* (Classe des Sciences), No. 11, pp. 753-765. B xelles, 1912.

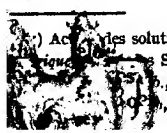
The writer used wheat grains and the same apparatus as descri in his previous papers (1). He started with a $\frac{N}{100}$ solution of potassi chloride, and measured the effect of adding chlorine, potash and hydr chloric acid to electrified and non-electrified solutions. He also us sulphuric acid, electrified solutions of copper sulphate, and finally $\frac{N.}{1000}$ solution of potassium chloride.

As a result of these experiments, the conclusion is reached that t effect, favourable or otherwise, of electrolytes on germination is due a disturbed state of equilibrium of the solution — that is to the liberati cations or anions — and not to the acidity or alkalinity produced by t electrolysis. Further, it is suggested that the ill effects of the solutio are caused by a colloidal precipitation within the root cells.

116 - **The Chemical Composition of the Oat Kernel. Variety and Va ation.**

BERRY, R. A. The Oat Kernel. — *British Association for the Advancement of Scie Dundee*, 1912. Section M (Agriculture), *m* 8. London.

This paper gives results obtained from an extensive series of ov 700 complete analyses of the oat kernel extending over several yea The oats were grown at the Experiment Station of the West of Scotla



(1) Action des solutions aqueuses d'électrolytes sur la germination. (*Bull. de l'Acad. ... Sciences*), 1909, p. 1076). Action du courant galvanique cont ..., 1910, p. 51). Action des liquides anodiques et cathodiques su ..., p. 391).

ltural College, on various farms in the West of Scotland, and, in on, in 1911 at a few centres in the South of England and Wales.

ARIETY. — By tabulating the grain of over a hundred varieties, ling to the percentage and weight of kernel, along with the chemi- alyses, the writer has distinguished several more or less well-de- types:

he White Grains: 1) small grains with a thin husk, a high percen- f oil, and an average percentage of nitrogen; these are character- f and include the old Scotch varieties with the new strains selec- om them; 2) large grains fall into two groups, (*a*) a thick husk, percentage of oil, and high nitrogen, (*b*) a thin husk, a higher per- e of oil, and a lower nitrogen; 3) grains intermediate in character hemical composition include the bulk of the newer hybrid varie-

he Black Grains: 1) small grains with a thick husk, low oil, and aver- itrogen; 2) medium grains with a thick husk, high oil, and low en; 3) large grains with a thin husk and the richest kernel of the ated oats.

hese are the winter oats. The reddish and yellow grains form ite groups. The wild oat surpasses all in richness of kernel.

ARIATION. — In this respect the results show that climate is the most bing factor. Distinguishing characters associated with a certain climatic combinations become greatly modified and, in some cases, t obliterated when the conditions are radically changed. Scotch own in the South of England and Wales in the dry and warm summer ıı yielded grain of smaller and drier kernel, a thick husk, higher gen, and lower oil and weight per bushel than grain grown in Scot-

The cooler and more humid climate of the West of Scotland and nger maturation period produces in the grain the opposite tenden- except in the poorer and drier localities. The average variation of ain of over 63 varieties grown annually from 1909 to 1911, under the xtreme climatic conditions prevailing at the Experiment Station, ı comparison small. The unusually warm summer of 1911, however, a slightly larger kernel with a thinner husk, slightly poorer in oil icher in nitrogen than the grain of 1909-10, and would resemble the of the normal English summer.

Time of sowing and ordinary dressings of manures produce little on the grain. Soils rich in nitrogen produce grain richer in this nt.

Foreign and Colonial oats are usually, but not invariably, small, husked, relatively rich in oil and nitrogen, and of low weight per el; as a rule they have a short maturation period.

OIL AND NITROGEN. — Micro-chemical tests show the oil to be lo l in the aleurone layer and the embryo. The latter [illegible] fr the 0 4 per cent. of the kernel, and contains between [illegible] and the ent. of the oil, and between 4.5 and 6.5 per cent. [illegible] the whole kernel. The smaller grains of the same vari[illegible] cre

richer in oil but slightly poorer in nitrogen. Analyses made every th days during the formation and maturation of the grain show the to increase rapidly in the first half, then remain stationary, whilst nit gen increases all through the period.

The results seem to show that the variation of the principal cons tuents of the oat kernel is greater than is usually supposed.

117 - On the Application of Precipitine Reactions to Seed Identificati

ZADE. Die Verwendbarkeit der Präzipitinreaktion in der Samenprüfung. — *Fü Landwirtschaftliche Zeitung*, Year 61, No. 23, pp. 807-810. Stuttgart, December 1, 1

The present methods of seed examination only determine in a limi manner the quality and source of the seeds: thus it is not possible distinguish (without previous cultivation experiments) a winter from summer wheat; nor an awned from an awnless variety. In the sa way, the nature of the seeds of leguminous fodder crops is only asc tained and, then not with absolute certainty, from the impurities fou among them. Relander (Studien über die Verwendbarkeit der Pra pitinreaktion in der Samenprufüng, *Abhandlungen der Agrikulturwiss schaftlichen Gesellschaft in Finland*, Heft 1 : Helsingfors, 1911) has beg a series of experiments with the object of adopting the precipitine meth for seed identification; this method is based upon the knowledge acqui respecting the immunity of animals to infectious diseases and which writer briefly summarizes.

The blood of infected animals has a specific reaction, *i. e.* it gi a precipitate in the presence of a culture (filtered) of the bacteria wh it contains, but none in the presence of a culture of other bacteria. these reactions the name of precipitines is given. Further, an anim into the blood of which the albuminoids of another species have be introduced, has the power of reacting in conformity with these (alb mino-precipitines). Thus, a rabbit which has been inoculated with hu serum gives a precipitate (of albumino-precipitine) in presence of hu serum, but not in the presence of the serum of any other animal. Th method, which is a very delicate test, has been adopted for recogniz the blood of different animals, and recently for discovering the differen in the albuminous substances of the lower and higher plants, and th determining the degree of affinity existing between different plants.

The manner of proceeding is as follows : A sample of wheat, for i stance, is reduced to a fine powder, and treated with a given quanti of a physiological solution of sodium chloride. The extract is filtered an injected in small quantities repeated at fixed intervals (3 to 10 day into the blood of the animal which is the subject of the experiment. Th a small amount of the blood of the animal is taken and freed from co puscles by centrifugation; the residue, called the immunised serum filtered till it becomes completely clear. On adding to the filtra [illegible] drops of the wheat extract which was used for the i [illegible] precipitate is obtained, which is not produced if extracts a [illegible] have been prepared from other seeds. The reacti

; specific and can serve as a diagnostic. The practical value, ;r, would be very small if this method only served as a way of uishing one species from another, since this is effected already by examination. Relander's experiments have shown the possibility ining from precipitine reactions a greater amount of differentia- ian is furnished by direct seed examination. He found that the of a rabbit wich had been injected with an extract of two-rowed reacted in the presence of a similar extract (the reaction being nergetic for the same variety than for different ones), while there reaction in the case of six-rowed barley.

should be noticed that there is not always an agreement between al affinity and bio-chemical homology, and that certain species identified by the bio-chemical method more easily than others. wo-rowed barleys form anti-bodies much more easily than do six- varieties. In only one case was there a similar reaction from two- and six-rowed barleys. This, Relander explains as due to the fact e two-rowed barley in question was the product of a cross with a ed barley.

ie experiments made with red clover showed that the Relander l serves to distinguish Italian and American clover seed from and Norwegian, but the two latter are indistinguishable from one r.

ie writer mentions, in conclusion, that the results hitherto obtained the hope that the precipitine method will prove a valuable assist- n seed identification.

n the Inheritance of some Characters in Wheat: I.

ARD, A. and HOWARD, G. L. C. (Agricultural Research Institute, Pusa) in *Memoirs e Department of Agriculture in India (Botanical Series)*, Vol. V, No. 1, pp. 1-46. Cal- a, September 1912.

ie results of hybridisation experiments carried out at Pusa during ars 1905-1912 are given. In all cases the work was started from nes, and the paper deals chiefly with three series of crosses with wheats :

Felted × *Smooth Chaff.* — The felting of the chaff in the wheat ied is shown to be due to at least two kinds of hairs, each of which a single Mendelian factor and is inherited independently of the

Red × *White Grain and Red* × *White Chaff.* — Red colour in ain may be due to the presence of one, two or three independent lian factors, each of which may be isolated and is capable of pro- red colouration alone ; but the shade thus produced varies. In se studied, the effect of two red factors combined in one was itive. Only one factor was found to occur in all the c of be ed and white chaffed wheats.

Bearded × *Beardless and Black Awned* × *White* ding the e of at least two Mendelian factors in the beard

demonstrated, and in future a sharp distinction will have to be d
between wheats which are absolutely beardless and those with
short awns or tips. Only one factor was found to occur in the
between black awned and white awned wheats.

Less extensive investigations were also carried out on:

1) *The consistency of the grain*, by crossing a constant soft w
with a constant translucent wheat. Consistency in this case appe
to be due to a single Mendelian factor.

2) *The shattering of the ear*, which appeared to be due to
Mendelian factors.

3) *The standing power of the plant*, by a cross between a
strawed well rooted wheat, and a strong strawed wheat with inf
rooting capacity. All possible combinations were found, and the p
pect of obtaining a well rooted, strong strawed wheat in the future se
favourable.

In none of the crosses was there any indication of dominance in
first generation, which in all cases proved intermediate.

119 - **A Summary of Experiments in Barley Growing conducted dur
the Eleven Years 1901-1911.**

HUNTER, H. in *Journal of the Department of Agriculture and Technical Instructio
Ireland*, Vol. XIII, No. 1. Dublin, October 1912.

The experiments were commenced in 1901 in Cork and Tippera
but the work was soon extended, and in time included all the bar
growing counties in Ireland. At first the size of the plots was two
tute acres each, but after 1908 this was reduced to one acre.

Malting Experiments. — For a number of years the produce of
various plots was malted by Messrs. Guinness, and a sample from e
subjected to chemical analysis in their laboratories. The figures in
cases agree with those obtained by previous experimenters, the high
quality barleys being those characterised by a low total nitrogen conte

Results will be discussed in detail later when the question of yield a
quality is reviewed. With regard to the weight of 1000 corns, assum
equal quality, large grains give better extracts than smaller ones,
in practice it is found that the former do not mature as readily nor
the same degree as the latter, and are in consequence rarely of such go
quality.

Variety Experiments. — The varieties tested were:

a) Narrow-eared — Archer, Scotch Chevallier, Hallett's Chevallier, Old Irish
Danish Archer.

b) Wide-eased — Goldthorpe and Standwell.

A summary of the results is given in the following tables:

Comparison of average values of Archer with other varieties.

	No. of Tests	No. of years	Yield * bris. sts.	Av. value p. acre ** in shillings	% difference in favour of Archer
Archer	67	8	11 12	182	8.3
Goldthorpe			10 4	168	
Archer	28	5		166	20.3/3
Goldthorpe			9 14	154	
Standwell			8 14	138	
Archer	25	3	11 14	179	11.0
Scotch Chevallier			10 15	163	
Archer	15	2	12 12	194	12.8
Old Irish			11 9	172	
Archer	11	1	13 5	201	16.9
Hallett's Chevallier			11 4	172	
Archer	28	4		190 21/2	— 0.1
Irish Archer				190 3/4	

Yield = quantity of saleable malting barley given in "barrels" = 16 stones = lbs.

** Value per acre = value of total crop, *i. e.* malting corn + screenings.

Comparison of average nitrogen content of Archer and other varieties.

	No. of tests	No. of years	% nitrogen in grain
Archer	66	8	1.53
Goldthorpe			1.52
Archer	24	4	1.56
Standwell			1.64
Goldthorpe			1.55
Archer	25	3	1.54
Scotch Chevallier			1.63
Archer	15	2	1.55
Old Irish			1.69
Archer	11	4	1.55
Hallett's Chevallier			1.66

Both for quality and yield, Archer heads the list, and the only objection that can be urged against it is its tendency to late ripening; this can usually be obviated by early sowing. In the broad-eared class Goldthorpe proved superior to Standwell and also to two other varieties of Goldthorpe raised by the Department. The comparison of Archer and Goldthorpe does not show marked superiority for either variety: in every year excepting 1901 the value per acre of Goldthorpe on one of the plots has exceeded that of Archer, but there is not sufficient evidence to warrant the general statement that the former is better adapted to certain soils or districts than the latter. Goldthorpe is readily distinguished by its ears falling off the straw, to which defect

for this reason its claims to general recommendation clearly out any that can be advanced in favour of Goldthorpe.

Pure Seed Raising Experiments. — These were originally st on account of the difficulty experienced in obtaining pure seed of th ferent varieties that were being tested. In 1904 it was decided th future the progeny from *single ears* was to be used, but to bridge the time which must elapse before a sufficient amount of seed cou produced from this source, "group selection" was practised, *i. e.* a number of ears from each variety were selected, and the grain use seed production. In 1906 a selection of Archer was introduced from mark, where many single ear cultures have been propagated, and t against the unselected Irish Archer which had been grown under the artment's supervision since 1904, and which was at least 94 per pure. In 1907 the "group selected" Irish Archer was tested ag the Danish Archer, and in 1908 the "single ear" culture of Irish A was ready for trial. The following figures indicate the value of the tion-factor on the yield and quality of the barley crop:

		Yield — bels.	sts.	Value per acre in shillings —	Nitrogen content %
1906	Irish Archer	11	12	174	1.52
	Danish "	12	9	185	1.46
1907	Irish Archer	12	2	187	1.55
	Danish "	12	7	192	1.56
1908	Irish Archer	11	2	188	1.44
	Danish "	11	4	187	1.48

The superiority of the Danish Archer, which amounts to 11s. per in 1906, is reduced to 5s. per acre in 1907 and to nil in 1908. These periments suggested a further trial of the extent to which the ch of seed from one locality to another is beneficial. Danish Archer freshly imported from Denmark in the spring of each year, and compa with Irish Archer and Danish Archer grown in Ireland since 1906, the following results:

Year	Irish Archer		Danish Archer imported 1906		Danish Archer im imported each y	
	Value per acre shillings	% N.	Value per acre shillings	% N.	Value per acre shillings	% N
1906	174	1.52	185	1.46	—	—
1907	187	1.55	191	1.54	192	1.5
90[illegible]	188	1.44	184	1.43	187	1.4
[illegible]	220	1.47	222	1.46	224	1.4
[illegible]	159	1.55	161	1.54	159	1.5
[illegible]	187	1.64	188	1.64	—	—

hese figures leave no room for any conclusion other than that no nce either in yield or quality exists between Danish Archer seed in Ireland for one or more seasons and freshly imported seed.

The Cultivation of Rice in Java.

ion, S. V.: Studien über den Reisbau auf Java. — *Der Tropenpflanzer*, Nos. 9-12, pp. 1-484, 527-542, 581-591, 645-660. Berlin, Sept.-Dec. 1912.

his paper is the result of observations made by the writer in Java, f abstracts of recent publications on the subject, chiefly by the l Government.

mportance of rice culture in Java. — The production of rice in Java h (5.2 million tons of paddy in 1909), but insufficient for the con-ion of the country. The rice is distinguished by its good quality. western part of the Island, rice fields occupy the whole of the cul-e area both on the plains and on the mountain slopes, on which are arranged as terraces and reach up to 3900 feet.

lice is grown by the natives in small farms; only exceptionally, y Europeans, on large estates. The Government takes much in-in the progress of the cultivation of this cereal. Experiments ig on rice growing are conducted at several experiment stations specially at the one of Tjikömöh to which a school of agriculture e more educated natives is attached.

lice is cultivated in Java in two ways, either in "Sawahs" or "Te-s." The first are terrace-like perfectly level fields, surrounded by nkments and irrigated artificially or watered only by the rainfall. are broad and regularly shaped in the plains, narrow and irregular n on the hill slopes; the tegalans are always on inclined and uneven they are not banked round and are watered only by the rain. A distinction between dry and wet rice fields does not exist in Java, se rains fall throughout the year; they are always abundant in the n part of the Island, but less so from May to August (that is during astern monsoon) in a part of the east of Java. About 2 per cent. e "sawahs" occupy swampy lands or those situated on the shores es (Moeras-Sawahs). In 1909 in Java and Madura (not including rincipalities of Djokjakarta and Soerakarta) the total area under as 6 106 418 acres, of which 3 556 378 ac. were irrigated sawahs, 530 ac. sawahs depending upon rainfall and 539 940 ac. tegalans. moeras-sawahs occupied 117 572 acres.

Irrigation works. — The most important irrigation works and canals constructed and are kept up by the Government or with its assis-

Thus the "wadoeks" or reservoirs of rainwater arranged as ter-on the hill slopes in the residencies of Soerabaya, Rembang, [illegible] ang were improved and are kept in repair by Government, [illegible] of com-p of the secondary canals devolves on the communes [illegible] of the wners.

he lesser irrigation works and sometimes the pr[illegible] during the elds are carried out in common by the inhabitant[illegible]

The canals are fed by small barrages across the rivers; they br into lesser canals which convey the water to groups of rice fields, number of which ranges from 3 to 20, but most frequently from 4 each of which is situated on a lower level than the preceding ones.

Irrigation experiments. — The irrigation water is almost the fertilizer used in the rice fields. L. G. den Berger, chemist of the artment, conducted in the Tjikömöh Rice Experiment Station a seri accurate experiments on the distribution of the mineral matter di ved and held in suspension in the irrigation water, on the quantitie it that were deposited and on their effect upon the crops.

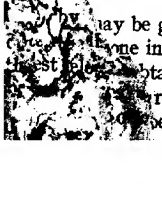
As a result of this experiment he came to the conclusion that a good distribution of the water and of the fertilizers it contains, it w be advantageous to alternate the fields that are the first to receive water from the irrigation canals.

The excessive deposition of silt in the fields that first receive the w must be avoided, especially if it is calcareous, because it would dimi the permeability of the soil, or if too rich in organic substances, this would favour vegetative growth too much at the expense of yield.

Soils. — For the most part they are very clayey, deep, and of and regular texture; they are poor in humus (rice fields rich in hu have frequently an acid reaction, which does not suit rice) and in li they are also frequently relatively deficient in phosphoric acid. E cially in the western part of the island laterite soils prevail. The bl alluvial soils of volcanic origin in the Passoeroean residency, especi rich in apatite, are the best of Java and give very heavy crops. central Java there are recent volcanic soils containing much potash deficient only in nitrogen; when they are manured with sulphate of monia they give excellent crops.

Varieties and selection. — The earliest varieties mature within months from sowing, the latest in six or seven months. Besides *O sativa*, *O. glutinosa* is also cultivated; both of them possess many v ieties, some being more suitable for growing in sawahs, others in tegal some are bearded, others beardless, some early, some late. The R Experiment Station has isolated and cultivated experimentally 800 g native varieties, the selection of which has been begun on the Sw lines.

Rotation. — After the first rice crop (October to March), that during the west monsoon, if the rice field is irrigable the soil is left f low for about a month, during which time the harvested paddy is di and stored; then the field is again flooded and the cultivation of rice



ay be grown on the same field for several years in successi ne in the moist parts of western Java. At most, two cr btained, but those varieties which require 7 to 9 mont rvesting and yield three crops in two years are preferr better product.

West Java, especially in the Preang regency, the cultivation of rice
ates from time to time with the rearing of gold fish. Two months
fficient for the fish to attain a marketable size.
uring the east monsoon there is not enough water available, one part
fields is put under rapidly growing dry crops such as earth nuts,
arra groundnuts, soy beans, cowpeas, moon beans, several kinds
sicums (lombok), sweet potatoes, yams ; and in the very dry dis-
especially of eastern Java, a good deal of maize is grown, as well
ghum, millet, coix, etc. and, among the plants intended for sale,
co. Sometimes, after rice, the soil is left fallow for a few months
tilized as pasture for buffaloes and other cattle.
he crops which follow rice in the rotation, are arranged in the
ing decreasing order of merit according to their property of oxi-
the soil and of preserving its fertility : Leguminosæ ; other dry
; fallow with grazing ; fish rearing. Flooding the soil without any
ation is absolutely to be condemned, also because it favours the
l of weeds, especially *Pontederina crassipes*. *Special rotations* are
where the cultivation of the sugar cane or of tobacco is much prac-
1). After sugar canes, if there is sufficient water, the rice fields are
diately prepared ; in the contrary case, which is frequent, Legu-
æ are grown for two or three months. Anyhow, by March or April
addy must be harvested to make room for the preparation of the
r sugar canes, which are planted from April to July.
Cultivation in the sawahs. — The work of preparing the ground lasts
: 50 days. Care is taken not to make the seed beds in too fertile
The rice is sown 30 to 40 days before transplanting. Formerly
whole ears were sown; now the sowing of the separated grains is
rred. The seeds that float on the water are discarded; the rest are
ed in water for two or three days, being kept in baskests in running
r.
One pound of soaked rice is enough for about 8 sq. yds. of seed bed ;
390 sq. yds. of seed bed are sufficient for one acre. The seed-
are moderately irrigated or not at all. In the first case the seedlings
e planted out 30 to 40 days after sowing; in the second sometimes
any as 100 days are necessary. The use of dry seed beds is contin-
spreading. Before removing the seedlings from the seedbeds these
well irrigated if they are dry beds ; if, on the contrary, they are
ed beds the water is turned off. In western Java the seedlings about
) 16 inches high are tied into small bundles and a half or one third
eir haulms are cut away. The seedlings are set mostly in rows in
dry or almost dry fields. In the Preang regency two to four seed-
are planted in each hole ; a group of two or three plants gi[illegible]
e 15 to 20 haulms. The distance at which the seedlings [illegible] of [illegible]

1) See MIEHE, H. Der Tabakbau in den Vorstenlanden auf Java [illegible]
Year 15, No. 9. pp. 468-479. Berlin, 1911. See also No. 134

from each other varies considerably. In the plains, varieties hav
a long period of vegetation and consequently freely tillering, are plan
at intervals of 8 to 10 inches, while short-lived varieties that do not t
ler much are planted at 5 to 6 inches apart; in the mountains, in poo
soils, the intervals are still less.

In the first days after transplanting the rice is moderately irrigat
after 15 to 20 days it is flooded. Shortly afterwards the first weedi
is undertaken. Then for two or two and a half months about 4 inches
water are kept on the land. In the second half of this period the secon
and last weeding is carried out, the water being turned off two days pr
viously and admitted again two days after. When the ear begins
form the depth of the water is diminished, and when the ears begin
turn yellow the water is completely turned off.

Cultivation in the tegalans. — The rice is mostly cultivated togeth
with other crops, bananas or herbaceous plants. In this case as man
as three crops a year are harvested, for instance: maize, rice and sesa
mum. Tegalans are frequently used to begin the cultivation of land whi
up till then had been under bush. This is cut, allowed to dry and the
burnt; the ground is broken up and sometimes divided into rough te
races to prevent too much earth being carried away by the rains. Aft
the rains of the western monsoon, the rice is sown in holes. The secon
rice crop is about $^2/_3$ of the first, and the third does not always cov
expenses. The poorest soils, after several harvests, are left to them
selves for some years, during which they get covered with bush; the ground
is then broken up again. In 1909 there were 2 712 500 acres of regular
cultivated tegalans, of which only 525 000 ac. under rice. The burnin
of forests followed by the growing of mountain rice (as it is still practis
in Siam and in the Sonda Islands) is unknown in Java.

Harvest. — The rice is reaped very high, in two or three times, r
moving the ears singly by means of a special knife with a curved blad
The reapers are paid in kind, from $^1/_{25}$ to $^1/_5$ of the quantity reaped
most frequently $^1/_{12}$ or $^1/_{11}$; those who, besides reaping, have assiste
in the preparation of the soil or in transplanting the seedlings, get fro
$^1/_5$ to $^1/_4$.

Successive operations. — When the rice sheaves are dry they are pl
in huts with interwoven bamboo sides and roof of alang-alang (*Imperat
arundinacea*). After 40 days husking begins. For this purpose wooden
mortars are used, and only the quantity consumed in the course
of the day is husked at a time. In Java there are also mills for the me
chanical husking of rice; most of them belong to Chinese. They a
driven by water power and are of a somewhat primitive character. T
rice all [illegible] turn out has a good many broken grains and is not suited f
[illegible] by [illegible] the supply for which comes from the European mills
[illegible] neighbourhood.

[illegible] average yield of irrigated rice fields is about 7120 lb
[illegible] fields depending only on rainfall 4750 lbs. per acre, a
[illegible] but 3560 lbs. per acre.

Diseases and pests. — "Omo poetih," which means white disease, kind of etiolation which attacks the seedlings in the seed beds and ly disappears on transplanting ; it is caused by insufficiency of plant ot by mouldiness of the seed beds; it is frequent but not very injur- "Omo bang" or "mentek" appears only 40 or 50 days after ing out; it is caused by *Tylenchus oryzae*, which attacks the roots. disease is at present limited to the central parts of the island, and ometimes caused very considerable losses. The only remedy rto known is to alternate rice with dry crops.

The larvæ of *Schoenobius punctellus* devour portions of the internodes e haulm, which in consequence produces ears with no grains in

Leptocorisa acuta sucks the juice from the ripening grain and some- does much mischief.

n April and May at times a nocturnal insect, called by the natives ang-sangit" appears in great swarms which would destroy whole if they were not controlled by the lighting of fires in which they their wings.

Among vertebrates, voles are the most injurious. Their numbers ept down by protecting the great rice field snakes (*Python bivittatus P. reticulatus*).

Among birds the most harmful are *Amadina oryzivora*, several spe- of *Munia*, etc. (1).

The Cultivation of Rice with the Help of Machines.

AIN, F.: La culture méchanique du riz en Indochine.(2). — *Journal d'Agriculture tro- cale*, 12th Year, No. 137, pp. 321-325. Paris, November 30, 1912.

The writer, in analysing the monthly reports of the Indo-Chinese growing Association, points out the importance of the results obtained 12 by M. Alazard, agricultural engineer, attached to the Association, after having shown the necessity of improving the plant used in the anical tillage of the soil, claims to have solved the problem of weeding utting the reeds under water by means of a mower. By sowing tly in the rice field, vigorous and fertile plants are obtained.

It has likewise been proved that machines can be used for ploughing al rice fields, that is those exposed to flooding during several months, that transplanting is not indispensable in order to obtain a crop. e two points are of capital importance, as well as the fact that reeds ot an unsurmountable obstacle to the cultivation of rice and that the grower possesses suitable machines for their destruction. The of this means is connected with the observation of certain physiolo- conditions of the existence of plants: when plants are m[illegible] r the crown and the roots are asphyxiated and die rapidl[illegible]

(1) See No. 27, *B.* Jan. 1913.
(2) See No. 1612, *B.* Dec. 1912.

reeds that are mown do not send out new shoots. These results, espe considering the conditions under which they have been obtained, are cient to encourage further efforts in the cultivation of rice with the of machines.

122 – **Cambodia Soy Beans.**

Soya de Cambodge. — *L'Agriculture pratique des pays chauds*, 13th Year, No. 116, p Paris, November 1912.

The Colonial Garden has lately had occasion to examine a sa of soy beans from Cambodia. This sample was analysed in the la atory of the Chemical Service and found to contain :

Water	7	per cent.
Proteins	41.6	,,
Fat	18.6	,,

The fat content of this soy is rather high, the average being 17 to 18 per cent.

This soy, submitted to expert brokers, was judged to be of good qu and of easy sale. Cambodia seems capable of producing large quanti of this pulse. According to information received it is cultivated in C bodia only for local consumption.

123 – **Experiments in Growing Lucerne of Various Origins in Denm**

HANSEN, P. Dyrkningsforsög med Lucerne fra forskellige Avlssteder. — 63 Beret fra Statens Forsögsvirksomhed i Plantekultur. — *Tidskrift for Landbrugets Plan* Vol. 19, Part 3, pp. 377-411. Copenhagen, 1912.

Comparative experiments in growing lucerne of various orig were carried out between 1901 and 1907 on the experimental fields the Danish Service for Plant Selection. These experiments were a c tinuation of a preceding series extending over the period from 1884 1899, and dealt with 40 samples from Hungary, 19 from Germany, from France, 13 from Italy, 17 from Russia, 2 from Spain, 12 from Amer and 4 from Turkestan, altogether 128 samples grown in 610 plots.

From the results as a whole the following general conclusions m be drawn, taking into due account the conditions of Denmark.

Hungarian lucerne may be considered from the Danish point view as the best and the safest. All the samples proved good, and wi but slight differences. Its chief merits are its permanence and resistan to cold. The first cut gives the major portion of the yearly crop, t successive cuts yielding very little ; in the year in which it is sow a succeeding one. Hungarian lucerne is somewhat less produ the other varieties.

Lucerne is mostly a hybrid of *Medicago sativa and M. falcat* nt in the year in which it is sown and in the succeedi rds it becomes less productive, possessing a low p ared with Hungarian lucerne, German lucerne does n

s much at the first cut, but the successive cuts are somewhat more ant.

rench lucerne, according to the samples tested, was uneven, some good, but most inferior to Hungarian lucerne. The first year's f French lucerne was more abundant than that of the Hungarian , but its permanence was inferior.

alian lucerne behaves like French lucerne, only its permanence rior.

ussian lucerne: the few samples tested gave good results for the ear's crop, but the yield diminished from year to year.

e samples of American , Spanish, and Turkestan lucerne gave scan- lts, showing themselves unsuitable to conditions obtaining in Den-

aking as basis the following general averages for Hungarian lucerne:

Yearly yield in cwts. per "Tondeland" = 1.362 acres.

I Year	II Year	III Year
64.65	89.54	154.49

pressing the yield of the other varieties tested as percentages of ove, the following comparative figures are obtained:

Origin	Crop		
	I year	II year	III year
Hungarian	100	100	100
German	102	92	89
French	102	96	97
Italian	104	96	90
Russian	94	83	69
American	45	49	67

hese figures represent the suitability of the various lucernes to the- al conditions of Denmark.

The Exportation and Importation of Clover and Lucerne Seed into ungary in 1910-11 and 1911-12.

EDVARY. Külkereskedelmi heremagforgalmunk kétévi eredményének összehanson- sa. — *Mezőgazdák*, Year IX, No. 22, p. 184. Budapest, November 30, 1912.

he production of clover and lucerne seed in Hungary differs accord- the climatic conditions, and while almost none in abnormally dry ap years, the crop is lucrative when the season commences with an ant rainfall and concludes with a prolonged period of he[illegible] mp continues, the clover succeeds the better, while if th[illegible] of [illegible] ates, the lucerne is the more satisfactory crop.

fter reserving seed for home use, the rest of the pro[illegible] [illegible] sometimes even some of that needed for sowin[illegible] made up by imported seed; this trade depends [illegible]

commercial, agricultural and especially climatic. This is shown by following table for the commercial years of 1910-11 and 1911-12.

	Exports		Imports	
	tons	£	tons	£
Clover Seed.				
Wet summer 1910 (Commercial year 1910-1911)	4 741	270 848	1 196	75 919
Dry summer 1911 (Commercial year 1911-1912)	2 320	138 298	2 026	138 285
Lucerne Seed.				
Wet summer 1910 (Commercial year 1910-1911)	648	43 889	332	25 295
Dry summer 1911 (Commercial year 1911-1912)	1 095	71 342	279	21 864

It is seen that the revenue derived from the export of clover s (the imports having been deducted) during the wet year was £1995 while in the dry year it was only £13. But on the other hand, the luce in the wet year fetched only £18 594, as against £49 478 in the dry ye The result is that the clover years are the most favourable for Hunga in the present case the net total revenue from clover seed in 1910 1 £212 689, as against £49 491 only from lucerne in 1911.

The statistics show that the export trade is greatest in autumn; the import before sowing. The Hungarian seed is sold after the harv at from £4 9s. to £7 3s. per cwt., and before the time of sowing, fore seed is bought at from £7 to £8 12s., the higher price the latter fetc being due to its greater purity.

125 – Cotton Growing in Lousiana.

SPAHR (Hollensholm, La). Die Zuckerrohr-, Baumwoll- und Reiskultur in Louisi B. Der Baumwollbau (1). — *Der Tropenpflanzer*, 16th Year, No. 11, pp. 591-607 + Berlin, November 1911.

Cotton growing began in Louisiana towards the end of the seve teenth century; Siamese white lint cotton was introduced in 1758.

Climatic Conditions. — Louisiana is now one of the principal cott growing countries of the world, and this chiefly owing to its climat relatively high temperature (from April to November: the lowest me monthly temperature in November in Northern Louisiana being 7.7° the highest, also in Northern Louisiana, in July, 34.3° C.); long peri of vegetation; a good deal of sunlight (from June to September: comp [illegible] y days 19.4 in North Louisiana and 21 in S. Louisiana); regu [illegible] istributed rains during the growing period (on average 4 [illegible] month from June to September) and dry weather during t [illegible]

[illegible] on sugarcane see No. 128 below. (Ed

oil. — Cotton can be raised on all kinds of soil, though with vary-
ccess. On sandy soils the plants develop less; on heavy soils they
especially in wet years, considerable height, but in proportion to
ize do not yield much lint. The same in low lying lands: in fa-
le years the crops are good but in others they are much damaged
mal and vegetable pests. The most favourable of all are medium
However, with the aid of manuring and suitable tillage even the
vourable soils can be made to yield satisfactory crops.

ultivation. — As there is still a good deal of uncultivated land,
growing might have considerably extended if it had not been
d by the appearance of the boll weevil (*Anthonomus grandis* Boh.),
has not only set a limit to further extension but has obliged many
rs to give up cotton altogether.

otations. — Those most commonly adopted are the following:

a) 1st year cotton, 2nd year maize then cow peas,

b) 1st and 2nd years cotton, 3rd year maize and 4th year cow

c) 1st year cotton, 2nd maize and cowpeas, 3rd winter oats
at the end of October or beginning of November) then cowpeas
on the stubble in May).

d) as the preceeding, but with cotton for two years or in the 3rd
owing in the oats Japanese clover (*Lespedeza striata*) which occupies
th year also. On loams sometimes *Vicia villosa* or clover is sown
oats; on sandy soils crimson clover is sown in the oats and Velvet
in the maize or, these by themselves, or peanuts, especially the
ish variety.

Preparation of the Soil. — Is not always carried out with due care.
times it consists in merely ploughing up the ridges of the previous
before sowing. The best results are obtained by those farmers
begin their ploughing towards the end of autumn or beginning of win-
Among other advantages there is that of destroying many pupae
ll worms (*Heliothis armiger*). In the large estates the subsoil plough
so used; by this means alone the crop of seed cotton increases by
150 lb. per acre. After ploughing, which is done crosswise to the
ion in which the cotton will be planted, the ground is repeatedly
wed, and rolled until a garden-like tilth is attained. In low lying
d the rows are ploughed, so that the soil may dry better if the wea-
is unfavourable. On high land this is done only just before sowing
omitted altogether.

Manuring. — It is often defective. Experiments carried out for
years in succession at the Baton Rouge and Calhoun Experiment
ons have proved the necessity of completing organic ma[illegible] nclu-
ieals. The best results were obtained with 30 bushels p[illegible] of com-
mpost consisting of 100 bushels of cotton seed, 100 bush[illegible] of
manure, and 2000 lbs. of phosphate. At Calhoun [illegible] this
this compost yielded an average of 1513 lbs. of seed
at Baton Rouge 1246.6 lbs., whilst the unmanured

466 lbs. and 1034.3 lbs. respectively. The quantity of artificials giv cotton in Louisiana is trifling.

Varieties. — Early varieties are grown, especially short sta small bolled, Upland varieties. Long stapled early varieties (Sea Isl have been bred and the United States Department of Agriculture is deavouring to introduce them, but their cultivation and harvesting more difficult, and for ginning them special gins are required; further do not sell well on the local markets and they require continuous s tion; for these reasons few planters care to grow them. The most w ly spread varieties are the following:

1) Tooles Early Prolific. Short staple and small bolls. A 87 bolls give 1 lb. of seed cotton. It is a low early bush, and it prod much seed cotton and lint.

2) King's Early Improved. Short stapled, abundant, seeds sm long branches.

3) Simpkin's Early Prolific. Short stapled, somewhat ea and more productive than the preceding, long branches, short interno seeds small.

4) Mebane's Early Triumph. Short stapled, large bolls. Sl medium sized. 46 bolls yield 1 lb. of seed cotton.

Many farmers in the north of the cotton belt use imported seed. I ripens earlier than the native seed but every two years new seed has be imported.

In most cases the seed is taken from the ginning works. M farmers get their seed from merchants or direct from the growers, pecially in Georgia, S. Carolina and Alabama. Only a few of the lar farmers produce their own good seed by means of selection.

Interculture. — The seeds are sown in rows as early as possible w no more frosts are to be expected (March-April). The quantity of s is 1 bushel (30 lb.) per acre, though as experiments conducted in Te by the Bureau of Plant Industry have shown, 4 to 7½ lbs. of seed per a are sufficient under favourable conditions to give a good stand.

The distance between the rows ranges from 3 to 5 feet and betw the plants from 10 to 30 inches according to the soil and the variety cotton grown. According to the writer the advice to plant at a gr distance apart is not sound beyond a certain limit, because formerly cotton plants continued producing buds till September and even Octo whilst now the plants produce only up to the middle of August, beca after this date the boll weevil prevents any further bud formati Experiments carried out by the State Crop Pest Commission in the ye 1907 and 1908 showed that close planting gave the best results, increas the yield by 30 to 60 per cent. The most favourable distances w

	Between the rows	Between the plants
On poor high land	3 feet	10 inches
On rich high land and good prairie soil	3 ,,	12 ,,
On poor or very sandy plain land	3½ ,,	12 ,,
On well drained plains of medium fertility	4 ,,	15 ,,

These experiments showed also that in close planting the ants (*Solenopsis geminata*) played more havoc among the boll-weevil brood than heat or parasites.

A few days after sowing, the tilling of the soil begins again in order to keep the surface loosened. At first the harrow is used and then the cultivator. Singling is performed twice, once when the plants are about 6 inches high and the second time when they are 12 inches high; after this they are slightly earthed up, and, weather permitting, the ground is hoed once a week with the cultivator. At the end of July or beginning of August the soil is smoothed and thoroughly harrowed.

Topping has been given up.

Harvest. — The harvest begins usually at the end of August and lasts to the middle of December. The quantity picked by one labourer in a day varies considerably. Some barely reach 100 lbs., others pick 300 to 400 lbs., first class pickers attaining 500 and 600 lbs. The cost of picking is about 75 cents (3*s.* 1*d.*) per 100 lbs.

The cotton is not dried before being ginned. Ginning is done in special mills which deal with at least 50 to 75 bales a day and in some instances as many as 250 per day. The cost of ginning a bale is $2.50 (10*s.* 3*d.*). Rotten seeds are accepted. In 1906 there were upwards of 1500 ginning mills against 1200 in 1911. The seeds that are not used for sowing are sent to the oil mills, of which there are about 50 in the State.

Yield. — The average yield has increased somewhat of late years, but is only about 170 lbs. of lint per acre (in 1911 it reached only 143 lbs. per acre). With intensive farming and energetic control of the boll weevil it is possible to attain much higher yields, as is proved by statistics which show that as much as 356 lbs. per acre have been obtained.

Control of parasites. — The boll weevil appeared for the first time in Texas at Monclova in Mexico, where in 5 five years it played such havoc that cotton growing had to be given up; in 1850 it reached Matamoras 50 years later the Rio Grande. In 1862 it appeared at Brownsville, Texas, and in 1903 in Louisiana. By the end of 1908 it infested the whole cotton territory of the State. The harm that it has done may be seen from the following figures (next page).

For the direct control of the boll weevil, arsenate of lead sprays have been suggested, but owing to the difficulties attendant upon its application the method has not become popular. On the other hand the practice of collecting the infected bolls from the beginning of May to the end of June has become general. The bolls are placed in boxes covered with gauze, the meshes of which are wide enough to allow the parasites to escape but not the weevils. It would be of very great

Year	Under cotton acres	Lint 500 lb. bal
1902	1 617 586	882
1909	930 000	253
1911	1 075 000	365

to destroy the cotton plants early in autumn, but few growers mal their minds to do so. The utility of this measure, besides being p by the experiments of the State Crop Pest Commission, has been s by the immunity from the pest enjoyed by the plantations grown i calities in which the cotton plants had been destroyed by frost in th ceding year, as was the case in the northern parishes of Louisiana the frost of 1907.

For destroying the plants at the end of the season some mac have been invented, one of the simplest of which consists of a cyl of 18 inches diameter and 6 feet in length bearing sharp iron bl inches broad and 1½ inch thick. With this machine 10 to 12 acres p can be cut.

Before the appearance of the boll weevil those varieties the of which ripened before the danger of frost was to be apprehended considered early. Now early varieties are those that show first the ting of fruit buds. The signs of precocity are: low branches (the branches that do not bear fruit must not be more than four); short i nodes; fruit branches at every internode of the main stem or of the branches; continuous growth of the fruit branches, as the boll w attacks first the upper twigs and does not damage the bolls so long as t are available buds; the average breadth of the leaves for the plants o high lying lands must not be more than 6 inches and for the plains not t than 4 or 5 inches.

In selecting, the following points are also to be observed:

1) Size of the bolls (the larger bolls being easier to pick and o ing greater resistance to bad weather).

2) High percentage of lint (38 to 40 per cent.).

3) Length of staple not under one inch.

4) Resistance to bad weather.

bodia Cotton in Bombay Presidency.

in *The Agricultural Journal of India*, Vol. VII, Part IV, pp. 373-381. 12.

Cambodia cotton was introduced into the Madras P adicherry through two independent channels in 1

h 1905 (1). In the Bombay Presidency it was introduced from the ppine Islands in 1905, and from Tonking in 1906. Later on seed btained from the Madras Presidency as well as from various other es.

Experimental trials were commenced in Gujerat, but the local con- ns (a heavy black cotton soil and a rainfall of 36.33 inches) did not t to suit this cotton, which was then transferred to Dharwar in the of the Presidency, where it yielded promising results for a year o and then appeared to deteriorate as regards prolificness and re- ce to "red leaf blight" which attacks all exotic cottons at Dhar- On the contrary, good results were obtained in the south-east e Dharwar District, where Dharwar American cotton, introduced a century ago, had acclimatized itself, and is cultivated as a non- ted crop, being grown in the *rabi* season on the medium black soils own at the beginning of the monsoon on the red soils. Accordingly perimental farm was established at Gadag in 1908-9, with the primary of testing the suitability of newly introduced American and Cam- cottons and for comparing these with the Dharwar American. he results obtained — without irrigation — both on the farm and tivators' fields, prove this cotton to be well adapted for cultivation dag. The following table shows the results of comparative experi- with local saw-ginned Dharwar American.

	Yield per acre of seed cotton in lbs.		Ginning percentage		Remarks
	Cambodia	Saw-Ginned Dharwar American	Cambodia	Saw-ginned Dharwar American	
1910. .	430	384	42.80	30.87	
1911. .	410.5	221	38.30	30.70	A moderate season.
1912. .	197	101	38.05	28.30	A very bad season.

he season 1911-12 was characterized by exceptional drought. The rainfall for the season amounted to only 13.77 inches, of which only n. fell after the crop was sown, against an average of 23.43 inches. theless the above results afford the proof that Cambodia cotton is ught-resisting variety of exceptional capacity.

Cambodia cotton has spread rapidly in the Madras Presidency, where it suc[illegible] rigation. It is distinguished for its vigour, high yield and good quality [illegible] ncial c. ured land under irrigation the yield is usually stated to be from 125 [illegible] of lint as and never less; while yields as high as 2500 lbs. have been repor[illegible] centage of 33 to 35 per cent. of lint. H. SAMPSON., The introd[illegible] dia cotton in the Madras Presidency. — *The Agricultural Jour[illegible]* V, pp. 365-368. Calcutta-London, Oct. 1911.

Cambodia cotton has further the following advantages over local saw-ginned Dharwar American: A higher ginning percentage the seed cotton, being produced in large well-opening bolls, can be pi cleaner; the cotton is "bulkier," its colour is brighter and the st more uniform, and lastly it is markedly resistant to "red leaf blight." At a sale by auction held in 1912, Cambodia cotton fetched 43 per c more than the local variety. The spinning tests also yielded satisfactory results.

Among the sub-varieties of Cambodia, 102 E proved to be the and the economic results that may reasonably be expected from it given as follows:

	Cambodia 102 E	Saw-ginned Dharwar Ameri
Cost of production per acre	18s. 8d.	18s. 8d.
Yield: seed cotton, per acre	310 lbs.	275 lbs.
Price of 1 lb. unginned cotton	1.85d.	1.42d.
Value of produce per acre	47s. 9d.	32s. 9d.
Net profit per acre	29s. 1d.	14s. 1d.

It would therefore increase very considerably the wealth of district if the 200 000 acres annually devoted to saw-ginned Dhar American were sown with Cambodia 102 E.

The writer concludes by demonstrating the necessity of contin the selection of the Cambodia seed, so as to prevent any falling off i qualities, of multiplying the selected seed on a large scale, and last preventing cultivators allowing this cotton to become mixed with local variety.

127 – The Improvement of Cotton in India.

The Bulletin of the Imperial Institute, Vol. X, No. 3, pp. 351-372. London, 191

During recent years the Provincial Agricultural Department India have carried out experiments with a view to the improve of indigenous varieties and the trial of exotic cottons.

Many samples of cotton produced in the course of these experim were sent to the Imperial Institute, and the present article gives a count of the examination and commercial valuation of specimens Madras, Central Provinces, United Provinces, Eastern Bengal, A and Burma (2).

Madras cotton. — One of the chief native forms of cotton cultiv in Madras is known as "Tinnevelly." This really consists of a mi of two varieties, "Uppam" a small bolled variety of *Gossypium*

d leaf blight" (Physiological Disease). This reddening, resembling att most frequently toward the season's end and is most common upo e to lack of nourishment. Attacks of the mite cause a similar appea *Diseases of Economic Plants*, pp. 405-406. New York, 1910. (Ed.

2. *B.* Tan, 1912.

, and "Karunganni" a form of *G. indicum*. "Uppam" is grown
k cotton soils in Coimbatore and Madura practically as a single
. It is also grown mixed, usually with "Karunganni" and "Na-
(a form of *G. obtusifolium*) in the east of Salem, south of South
nd north of Trichinopoly. It is also grown throughout the black
as of Tinnevelly as a single crop or as mixtures containing as
5 per cent., the remainder being "Karunganni". The latter is
e extent grown also on red, mixed and shallow soils; it is a finer,
r and more even stapled cotton than "Uppam" and the Agri-
l Department is endeavouring to extend its cultivation in Tinne-

nong the exotic cottons which have been introduced, "Cambodia" (1)
ved the most successful, and it is said that on irrigated land it
our or five times the yield of the dry land indigenous cottons,
the quality of the lint is satisfactory. In Tinnevelly and Ram-
lls are being sunk on a large scale with the primary object of grow-
s cotton. The last crop was estimated at 33 000 bales of 400 lb.,
at £400 000.

e comparative examination of the Madras cottons carried out at
perial Institute has shown that "Karunganni" approximates in
s to Egyptian cotton (length from 0.8 to 1.1 in. and the average
er 0.00074 in.) while "Uppam" has the ordinary coarse char-
f most Indian cottons (length from 0.9 to 1.1 in. and average dia-
0.00084). In other respects the "Karunganni" cotton is little if at
erior to "Uppam". It yielded on ginning 28.1 per cent. of lint
inst 29.5; the weights of lint per 100 seeds were respectively 1.90
and 2.15. "Cambodia" is of very satisfactory quality (yield
ning 37.9 per cent. of lint or 6.89 grams per 100 seeds; length from
1.2 in.) and resembled samples of the same variety of cotton grown
rma.

he Georgia Upland Cotton is of good quality (yield on ginning
er cent. of lint or 5.27 grams per 100 seeds, and length from 0.9
inches) but inferior to the acclimatised Cambodia cotton.

mples of cotton from the Central Provinces. — The chief work of
gricultural Deaprtment in the Central Provinces on cotton has been
lection of improved forms from the native races of cotton.

he cotton known as Berar "jari" consists of a mixture of a number
inct races. Six of these have been isolated, and five of them, viz.
bium *neglectum* var. *vera*, *G. neglectum* var. *vera* sub-var. *malvensis*
-lobed and narrow-lobed forms), *G. neglectum* var. *rosea*, and *G.*
lum var. *rosea* sub-var. *cutchica*, have been grown experimentally
e varieties. The *vera* and *malvensis* forms furnish the most
but the coarser *rosea* and *cutchica* varieties yield a higher
t and would be the more profitable for cultivation in

See preceding abstract (No. 126).

Provinces. In the Tapti valley the finer types predominate; the
in Berar, Wardha and Nagpur.

The variety of native cotton known as "Bani" (*G. indicum*)
a fine silky staple, but as the yield per acre and the percentage o
are low its cultivation has been given up in favour of "jari." "
has been introduced and has done better than jari on certain rich "k
lands. So far it has proved immune to wilt disease (*Fusarium*
fectum Atk.) and is in demand where this disease is prevalent.

Experiments designed to ascertain the relative values of the ou
of the above mentioned cottons have been carried out at the Akol
perimental Farm during several seasons.

The plants were grown on the deep black soil characteristic o
cotton tract and were manured with cattle dung at the rate of 4
of nitrogen per acre. The results of the experiment are shown in th
lowing tables:

	Average outturn of seed cotton per acre for four years	Percentage of lint 1910-1911	Averag outtu for four calcula from t for 1910-
	lbs.		£ s
G. neglectum, malvensis	373	30.00	3 16
G. neglectum, vera	343	33.60	3 18
G. neglectum, rosea	402	40.00	4 13
G. neglectum, rosea cutchica	412	36.30	4 7
Berar «jari»	371	35.70	3 17
«Buri»	203	33.00	3 17
«Bani» (*G. indicum*)	255	29.00	2 18

These samples from Akola were of high grade for Indian cotton
they were of somewhat inferior strength. With the exception of "
chica" they were all of a much higher class than "superfine."
growing of these cottons should be encouraged in preference to the in
"jari" varieties, which are now so largely produced.

Cottons of the United Provinces. — The chief cotton produc
ferior grade, known as Bengals. Several crosses have bee
by
this cotton which give promise of being a considerable imp
existing varieties, but none are quite satisfactory and pro
of some form of Upland would be advisable.
samples received by the Imperial Institute for examin
of indigenous varieties grown at the Government

Results of the examination of the samples of cotton received from the Akola Experimental Farm.

	«Buni» acclimatised «American Upland»	«Bani» (*G. indicum*)	Broad-lobed *Malvensis*	Narrow-lobed *Malvensis*	*Vera*	*Rosea*	*Cutchica*	«Jari» (*G. neglectum*)
ield on ng . .	30.8 to 33.15	25.15 to 27.5	28.2	28.45	33 to 33.7	40.55 to 40.6	34.8 to 38.5	32.1 to 37.8
er 100 grams.	3.4 to 3.9	1.60 to 1.85	2.2	2.4	2.36 to 2.9	3.25 to 4.3	3.03 to 3.4	2.3 to 3.4
of staaches .	0.7 to 1.3	0.7 to 1.1	0.7 to 1.2	0.7 to 1.2	0.7 to 1.1	0.6 to 1.2	0.55 to 1.0	0.6 to 1.2
diaminches .	0.00074	0.00069	0.00083	0.00083	0.00082	0.00088	0.00091	0.000815

ral Station, Aligarh. One, the white-flowered country cotton (Rui), ed on ginning 40.5 per cent. of lint, or 3.26 grams per 100 seeds. staple was short (from 0.5 to 1 in). and coarse (average diameter 0.0009 and the other, yellow-flowered country cotton (Rui), yielded 35.7 ent. of lint, or 2.39 grams per 100 seeds, the length of the fibre varied 0.6 to 1.1 in. and the average diameter was 0.00081 in.; this cotton of good quality but somewhat deficient in strength.

Cottons from Eastern Bengal and Assam. — Cotton is grown on a comal scale only in the Garo Hills and Chittagong Hill Tracts. In both ties the variety grown is *Gossypium arboreum* var. *assamica* Watt, he ginning percentage of the Garo Hill cotton is considered to be ly higher than that of the other locality (50.1 per cent. against per cent. in the samples examined at the Imperial Institute); the of both samples was rough short (0.7 to 0.8 in.).

Cotton from Burma. — Experiments in cotton growing have been d out at the Mandalay Agricultural Station, the work being confined e present to the trial of introduced cottons and the classification of ndigenous cottons. The perennial or tree cottons have not been satisry. In the following table a summary is given of the results obd in the years 1909 and 1910, together with the results of the examn at the Imperial Institute. The annual cottons were sown in three feet apart, without manure.

It would appear that the Egyptian varieties are less suited to the conns of the localities in which the samples were produced [illegible] ncle[illegible] ican and "Cuban" cottons. All the samples, howeve[illegible]ag[illegible] retable quality, but with the exception of the "bani" [illegible] of [illegible] rather lacking in strength and were slightly stain[illegible] [illegible] t pests.

Variety	Yield of seed cotton — lb. per acre	Percentage of lint by ginning	Weight of lint per 100 seeds — grams	Length of fibre — inches	Average diameter of fibre — inches	Colour
Abassi (first year) . .	416	30.5	3.6	1.3 to 1.6	0.00067	Cream
Abassi (second year) .	150	35	5.0	1.1 to 1.4	0.00066	Pale red brown
Mitafifi (second year) .	750	33	5.3	1.2 to 1.6	0.00065	Pale red brown
Cuban (new seed) .	390	28.5	3.3	0.8 to 1.1	0.00086	Pale cr
Georgia Upland (new seed)	250	31.5	3.5	0.9 to 1.1	0.00074	Pale cr
Bani (first year) . .	—	26.9	1.75	0.8 to 1.2	0.00068	Greyish-
Cambodia	—	38.5	5.6	0.7 to 1.3	0.00073	Pale cr

128 – The Cultivation of the Sugar Cane in Louisiana.

SPAHR (Hohensholm, La). Die Zuckerrohr-, Baumwoll- und Reiskultur in L
A. Die Zuckerrohrkultur (1). — *Der Tropenpflanzer*, 16th Year, No. 10, pp. 5
5 figs. Berlin, October 1912.

The yearly consumption of sugar in the United States is 80 l
head, being inferior only to that in England where it reaches
per inhabitant. The United States produce about one quarter
sugar they consume, namely about 900 000 tons a year. Another q
is imported from the American possessions: Hawaii, Porto-Ric
the Philippines, and the rest chiefly from Cuba. Of the sugar pr
in the United States about 350 000 tons are cane sugar, of which so
Louisiana produces 325 000 tons (1910), which with the by-pr
is worth upwards of £6 200 000.

Area of cultivation. — The chief area on which sugar cane is
extends southwards from the confluence of the Red River along th
bank of the Mississippi and its former emissaries. The breadth
cultivated land varies from a few hundred yards to three English
Behind the cultivated belt the wooded swamps, in which the drain
are situated. The sugar belt comprises about one million acres of
of which about 300 000 are yearly under sugar, and the rest under
rice, potatoes, pulse, lucerne, etc. The cultivation of sugar canes
[illegible]ded to about 9 millions of still virgin soils; on the other
[illegible]tective duties on sugar were abolished the cultivation of
[illegible]d be condemned to disappear; consequently the erecti
[illegible]

[illegible] of the article on cotton appears as No. 125 above. (E

ar factories and the increase of the area under canes proceed
wly.
ieties cultivated. — 1) "Louisiana" or "Domestic" cane, with
and slanting leaves; it is suitable for clayey soils.
) "Ribbon": red cane striped with white, slanting leaves,
istant to moisture and suitable to clayey soils.
) "D. 74": dark green cane, erect leaves, high sugar content,
sistant to moisture and to drought, adapted to loose soils that
cake.
) "D. 95": with purple epidermis and parenchyma, erect leaves;
m sugar content, but requiring a rich soil.
e first two varieties, originally from Java, were introduced in 1820
a replaced all other canes; the other two varieties were distributed
by the New Orleans Sugar Experiment Station, which had se-
hem from a number sent by the Royal Agricultural Society of
ra. They are distinguished by their high sugar content and by
illering.
e two first named sugars are either consumed as such, or together
e 96 per cent. sugar are sent to the refineries.
oduction. — In average years the yield is about 31 cwt. of sugar
e on light soils and 21.6 cwt. on heavy soils; in favourable years
lds rise to 48½ and 36.8 cwt. per acre respectively. In dry years
ount of canes harvested is lower, but they are richer in sugar than
years.
st of production. — The cost of production is much higher in Loui-
than in the other sugar producing countries, being 3.75 cents,
d.), while in Java it is 1.5 cents (0.73*d.*), in the Philippines 1.75
.) and in Cuba 2 cents (0.98*d.*) per pound of raw sugar. This is
the light harvests and to the high rate of wages, especially of the
ging staff.
is state of things, however, is improving in the sense of a greater
n of labour between the sugar cane farmer and the mill owners.
sect Pests. — Of late years the cane borers have caused much
ief, the loss amounting sometimes to as much as 25 per cent. of the
The causes of the increase of these insects lie in the imperfect
ion of the seed canes and in the neglect of the advice given by the
iana Sugar Cane Experiment Station to burn the infected parts
destroy *Sorghum vulgare* and *S. halepense*, both of which are host
s of the cane borer.

Sugar Cane Cultivation and Sugar Industry in Peru for
M. CARLOS ROMERO. **Statistics for the Sugar Industry for 1911.** — *P*
M. IV, No. 8, pp. 424-429. Lima, November 1912.
The Section of Statistics, Direction of Agriculture
ry of Fomento and Public Works of Peru, of wh

See Nos. 1274 and 1342, *B.* Sept. 1912.

the chief, has compiled the statistics of the sugar industry in Per
the year 1911. In the present paper the most important data are g
some of them being collected in the form of tables.

Sugar cane is grown in all parts of Peru where the climate is w
but its centre of cultivation is in the coast region. This coast regi
practically a plain 1400 miles long by 30 or 40 miles wide and is fo
by the erosion of the western base of the Andean plateau. Excepti
the extreme north, it is very dry, but it is crossed by some sixty va
of great fertility.

The rivers which water these valleys bring down enormous qu
ties of water during the seasons of heavy rains and of melting sn
the greater number of them however almost drying up during the
of the year. The overflow from these rivers has contributed to the
mation of these productive lands, which are of an alkaline character, s
of them containing a considerable quantity of chlorides, sulphates
carbonates, soluble in water. The lands where canes are cultivated
generally rich in lime, compared with the cane lands of other count
Phosphoric acid is everywhere sufficient, as well as potash. There is pl
of nitrogen, but the quantity varies with each section.

Up to the present only three varieties of sugar cane are known
Peru, the white or yellowish white, the greenish yellow and the re
purple. Some foreign varieties have been introduced, one from Deme
and another from Hawaii, but neither seems to be superior to the s
cane of Peru. The plant diseases are fortunately not very formid
and the only one worthy of the name is known as "barreno" or bo
though it has not yet done any serious damage. In some valleys a ca
pillar has been found, which eats the leaves of the plants. Field
do very slight damage. Among the accidents to which the cane is li
there are: falling down, to which the white variety is especially su
and early flowering.

The saccharine percentage of Peruvian canes may vary from
to 12; this is due principally to the methods of cultivation. Gene
the sugar cane has much fibre, plenty of sugar and slight humidity.
juice is generally good and pure and it is readily manufactured.
seldom necessary to refine the juices; the sugars produced are of
colour, and a rather coarse grain, with high polarization and g
ally of easy crystallisation.

While in many districts from 18 to 24 months are needed for the
to ripen, in other parts of the coast only 16 months are required.
some lands under favourable conditions, up to 90 tons of cane per
[illegible] obtained, and in some plantations an average of 60 tons and
[illegible] by intensive cultivation. At the present time the average pro
[illegible] good plantations is probably from 35 to 45 tons per ac
[illegible] table gives a general idea of the average qualit
[illegible] of Peru:

Saccharine matter	15.77 per cent
Fibre	15.00 ,,
Moisture	66.02 ,,
Density (Beaumé)	11.7
Brix	20.87 per cent.
Pure juice	89.68 ,,
Saccharine	18.71 ,,
Sediment	00.47 ,,
Glucose	00.45 ,,

gar cane was introduced into Peru about the year 1570, and for time it was grown on a very small scale. The present sugar in- dates back thirty years. It is located chiefly in the coast region ; duction of sugar cane in the *sierra* and *montaña*, which is limited ıtity, is used largely for the manufacture of *chancara* (an alcoholic ge) and alcohol, which is totally consumed on the spot.

arly all the great sugar cane plantations have powerful mills, they not only grind their own cane but that of neighbouring plant- metimes they buy the sugar cane from those who have no mills, according to the quality and the price of sugar in the great centres, r grind the cane and receive from 30 to 50 per cent. of the sugar ng therefrom.

ntinuous cutting and grinding are possible in Peru.

ıe National Tax-Colletion Company furnishes the following data sugar industry in Peru in 1911.

Exportation :		
White sugar	91 819	cwt.
Granulated sugar	1 966 030	»
Syrups	374 680	»
Consumption of sugar :		
White sugar	639 644	»
Production of alcohol from cane :		
Cane alcohol	1 361 729	gallons

he data collected and, for alcohol, partly calculated by the writer omewhat higher figures, namely :

Production of sugar	178 533 tons
,, of alcohol	2 127 070 gallons

wo tables are annexed to the paper ; they give the data concerning oduction of the various valleys of the coast belt. The following he totals :

Cane ground	1 285 170 tons
White sugar	22 525 ,,
Granulated sugar	105 546 ,,
Syrups	21 926 ,,
Chancaca	1 [illegible]
Alcohol	78 [illegible]
Rum	4 [illegible]
Number of labourers	[illegible]
Average daily wages	2s [illegible]

130 - **Seedling Canes in India.**

BARBER, C. A. in *The Agricultural Journal of India*, Vol. VII, Part IV, pp. 30
plates XLI-XLVIII. Calcutta, 1912.

After comparing the respective advantages and disadvanta
the "vegetative" and of the "sexual" reproduction of cultivated p
the writer considers the economical value of the production, by
of seeds, of good varieties of sugar canes, especially of hardy and
ductive varieties capable of resisting the diseases which are always sp
ing and becoming more serious, and of holding their own against the
petition of sugar beets.

Experiments with the object of obtaining new varieties of s
cane were carried out in all sugarcane growing countries, especially b
Agricultural Departments in Java, the West Indies, British Gu
the United States and Mauritius; but it was soon discovered that
great bulk of these seedlings were of inferior character, many appar
reverting to what one might suppose was the original wild form of the p

A long labour of selection became necessary. As an instance it
be mentioned that in five years in Barbados some 20 000 seedlings
raised and that less than 1 per cent. of them are likely to prove o
timate value. In the same time in British Guiana about 330 000 s
ling canes were produced, and it is surmised that of the whole num
perhaps a dozen may be added to the canes grown in the country

In Java before 1850 there was practically only one kind of
grown, the White Cheribon. In that year a planter noted a red
among the rest: he separated it out and multiplied it. As it pro
hardier, more productive and provided with a richer juice, it rapidly
placed the older white cane in many parts of the island. In 1882, h
ever, a planter in the extreme west of Jave noted that his canes
stunted, developed many aerial roots and multitudes of side brand
resembling the curious bunching growth frequently noticed in So
India when the canes are irrigated with alkaline water or cropped
several seasons without change of seed. Around Coimbatore this k
of growth is known as "shuleh kutteh" and in Java as "sereh"
In 1892 this disease had reached the extreme eastern point and ente
the island of Bali. It was noted that ratoons were much worse affec
than plant canes and that the fields in the hills were comparatively
from the disease. The old plantations were accordingly renewed w
seed canes from the hills. It was estimated that in one year alone so
£200 000 were lost to the island through the disease, and this when
crisis produced by beet sugar was beginning. In order to solve
[redacted] several scientific sugar stations were founded to study the pl
[redacted]pects. They imported into Java canes from various countri
[redacted] the Indian variety called Chunnee. A number of th
[redacted]ties proved to be more resistant to the disease than

[redacted]. Dec. 1910; No. 1541, May 1911. (Ed.)

icanes, but none were considered completely satisfactory. Recourse then had to the production of canes by means of seeds, the Indian nee being largely used as a parent; and with good results. Besides disease-resistant some of the seedlings can resist drought, while s stand excessive moisture; some ripen early and others late, thus nuously supplying fresh canes during the whole of the milling season. As a result, it may safely be stated that the Java sugar industry a very much better position than it was before the appearance of the output having risen in 1911 to 1230 000 tons, placing Java only d to Cuba among the exporting countries.

The cane sugar industry in India is in an unsatisfactory condition. of the better-class canes are heavily diseased or, as in Madras, they rown on a very small scale, and the hardier and more widely spread ties are among the poorest in the world.

Consequently the improvement of the sugarcane by means of seed- has an immediate practical importance. Experiments with this t in view have been made in various localities in India; those carried it the Samalkota sugar station in the Madras Presidency led to the uction (by seeds obtained from the cultivation of imported varieties) od varieties; none of them, however, are really immune, and hardly are suitable for introduction into the large areas under cane in Nor- n India.

The writer has started at the College of Agriculture at Coimbatore work of breeding and selecting varieties of sugarcane, both local and rted from other parts of India, as well as the histological study of r reproductive organs. The canes flower very freely, but the form- n of seed is comparatively rare. The writer has ascertained that is due to the infertility of the anthers, which often do not open(1). s in the varieties Java 36, Java 247, Chin, Desi Saretha and Dhaula tha he did ntot find any anthers open. In Striped Mauritius, Red Green sports from it, Barbados 1529, Fiji B, and Vellai he found 1 0,5 to 4 per cent. open, while in Red Mauritius, Cheni and Purple uritius the percentage of open anthers rose to 30 to 70 per cent. Of e varieties only one, the Cheni of Mysore, is a native of the country. haps it is the same as the one which, under the name of "Chunnee", imported into Java from India and extensively used as a parent in crossing experiments.

Owing to the prevailing infertility of the local canes, there is not ch to fear from self-fertilisation, and this facilitates the work of cross- and selection. Both the Cheni and the Red Mauritius are in addition llent canes in their way, more or less hardy and to a ce[illegible] t mune from local diseases; it is expected that they wi[illegible] of [illegible] vices in the production of new Indian varieties. The [illegible] of the reporting upon the present state of the work of se[illegible] and the sification which he has begun.

(1) See No. 1628, *B.* Dec. 1912.

131 – **The Nitrogenous Constituent of Para Rubber and its bearin the Nature of Synthetic Rubber.**

BEADLE, CLAYTON and STEVENS, HENRY P. in *Journal of the Society of Chemi dustry*, Vol. XXXI, No. 23, pp. 1099-1103. London, December 16, 1912.

Gladstone and Hibbert were the first to indicate the nitrogenous racter of the insoluble part of Para rubbers (those from *Hevea brasilie* which is left as a sort of network after solution of the hydrocarbon (*Jo of Chem. Soc.* 1888, p. 680).

The writers have shown that the insoluble matter derived from rubbers of various sources is highly nitrogenous in all cases, and con up to 7 per cent. of nitrogen, and that the presence of nitrogen in the uble portion only occurs in rubbers which have received some mecha treatment; such treatment disintegrates the nitrogenous network.

Results with smoked sheet rubbers have already been given; in paper those from non-smoked rubbers and rubbers of sources other *Hevea* are described.

A sheet of plantation rubber was cut into small pieces and allo to soak in twenty-five times its weight of benzene; after several days upper layer was carefully decanted and replaced by fresh benzene; a another week or two the clear upper layer was again decanted and ad to the first portion and the rubber recovered by spontaneous evaporati this rubber was of a pale golden colour. The lower portion of the solut containing the dark nitrogenous insoluble matter, was similarly evap ted, and gave a dark coloured rubber. It therefore appears that mos the colouring matter in dark rubber is due to the insoluble matter. the dark colour is brought about by the action of oxydases, it is proba the non-caoutchouc constituents which are oxidised rather than the ca chouc itself.

The following specimens were tested: 1) the rubber not treat 2) a portion allowed to swell in benzene and then evaporated spontaneou 3) the lower half of a solution in benzene containing the dark insoluble mat and 4) the upper pale solution.

Analyses of the unvulcanized rubbers.

	1)	2)	3)	4)
Acetone extract per cent.	2.48	2.52	2.32	3.04
Nitrogen per cent	0.475	0.462	0.840	0.070
Calculated as protein	2.97	2.89	5.25	0.44

These samples were masticated and vulcanized under uniform c diti as to contain 7 per cent. of sulphur. The sheeted compou ured alongside one another in steam for three hours at lbs. per sq. in. (exclusive of atmospherie pressure). T st res was ample for vulcanizing 1),2) and 3); specime itted to the higher cures to find suitable conditio

alyses are given of the vulcanized rubbers as well as a diagram of ade in the Schwartz hysteresis machine. The breaking strain and ion were also determined.

Mechanical tests on vulcanised rubbers.

	1)	2)	3)	4)
Cure 3 hours at 35lb. pressure.				
Tensile strength . .	59	53	75	13
Elongation, per cent	910	950	840	710
Cure 3 hours at 45lb. pressure.				
Tensile strength . .	100	100	95	33
Elongation, per cent	740	780	600	1140
Cure 3 hours at 55lb. pressure.				
Tensile strength . .	50	—	—	41
Elongation, per cent	470	—	—	960
Cure 3 hours at 65lb. pressure.				
Tensile strength . .	40	—	—	30
Elongation, per cent	380	—	—	400

While it is open to question how far the quality of the rubber was im- d by the presence of more than a certain proportion of insoluble matter, would appear to be little doubt that its removal resulted in deteriora- No. 4) is undoubtedly inferior ; although 10 or 20 per cent. more disten- than the untreated rubber, its tensile strength (maximum only 40 ent. of untreated rubber) and other physical qualities were strikingly or. Rambong and Ceara appear to behave similarly to Para, although ormer contains much less and the latter much more nitrogen.

Obviously synthetic rubber cannot contain any insoluble nitrogenous er of the character of that found in natural rubber, and to add it so obtain the reticulated structure would probably be impossible. It fore seems reasonable to expect that synthetic rubber would have the same properties as sample no. 4).

In previous experiments the writers have shown that the removal of reater part of the resins from [illegible] rubbbers as Para grades and Ram- results in a marked dete[illegible], as shown by the difficulty in vul- ing and the lower figure [illegible]ded by the extracted rubbers. It would fore also be necessar[illegible] add resins to [illegible]thetic rubber; but the riments of Seidl show [illegible] not all resins h[illegible]e the desired ef[illegible] elutong for instance, [illegible]g useless. Experiments by L. [illegible] *rnal of the Society of Chemical Industry*, 1912, p. 888) [illegible] of [illegible] bservations of the writers as to the difficulty of [illegible] val of the resins.

132 - Contribution to the Study of Rubber in the North of Mada

HAMET, H. and JOSSE, L. : Contribution à l'étude du caoutchouc dans le Nord d gascar. — *L'Agriculture des pays chauds*, 12th Year, Nos. 115 and 116, pp. 265-372-379. Paris, October and November 1912.

The rubber plants found in the north of Madagascar are num Among Landolphias, *L. madagascariensis* is a liana of considerable up to about 100 feet, with a diameter at about 3 feet up of 4 to 5 i Its yield in rubber varies from 6 to 25 per cent. of the latex; the which is rose-coloured, soon turns brown on exposure to the air; th yields are those obtained during the warm weather; the best rul had by tapping the stem and the adult branches. It is classed the good average sorts and is worth about 60 per cent. of Para r

Landolphia Perieri gives a rosy-white rubber, full of nerve elastic, keeping very well, but the yield is very slight, varying to 17 per cent. according to the season.

L. sphaerocarpa, called "Reiabo" by the Sakalaves, yields abundant latex containing from 18 to 26 per cent. of fine quality r This liana is the most interesting among Landolphias, and in case of tations the writers are of opinion that it is the one that ought to be plied.

"Lombiro" (*Cryptostegia madagascariensis*) yields a good q latex with a rubber yield of 15 to 20 per cent., and great care is tak coagulate the latex from the adult branches. It is a kind easy to tiply by cuttings, layering and seeds.

"Bokalahy" (*Marsdenia verrucosa*) yields abundant latex, 10 to 12 per cent. of good rubber.

The various species of *Mascarenhasia* are called indiscrimi "Barabangas" by the natives. The rubber produced by these dif species is the kind called "Black rubber of Madagascar," and is q at 50 to 60 per cent. of the price of Para.

The distribution of these species is described in detail by the w "Lombiro" is found all along the coast on the dunes swept by th winds; the Landolphias grow under the shelter of the forests and edges of the wooded islands forming the great bush; the "Baraban seem to adapt themselves to the white quartz sands and cover the of water courses and grow even in the beds of torrents. All these ious rubber lianas are endangered by bush fires and by the violen the waters; it would therefore be [illegible] 2.97 to delimitate the areas are suitable to the production of rubber and a good deal would to be done to induce the natives to produce better prepared rubber [illegible] constant quality. [illegible] ur.

[illegible] h value of plantation products [illegible] especially to their [illegible] therefore necessary to increase the production and [illegible] ar rubber. It is for this reason that the writers [illegible] llowed the various operations that the natives [illegible] ber, and [illegible] have led them to intruduce, t

surveillance, some modifications in their special technique, especially a view of making them :

1) Free the latex from the impurities it may contain.
2) Treat it immediately upon its extraction from the plant.
3) Disinfect it preliminarily, to ensure its preservation.
4) Use a coagulent to the required degree of acidity.
5) Filter the coagulant.
6) Use an excess of coagulant in the latex.

Samples of rubber thus prepared by the natives were submitted to judgment of experts at Havre and Antwerp.

The following are the results of the comparison of the above rubbers Ceara plantation rubber, Java, Manihot and Ceylon Para.

	I Lombiro — per cent.	II Landolphia — per cent.	III Ceara — per cent.	IV Manihot — per cent.	V Ceylon — per cent.
sture	1.2	1.8	1.2	0.8	0.3
. . . . .	0.5	0.15	0.7	1.2	0.4
n	8.75	7.2	7.7	5.2	2.95
istance to heat : 10 hours at 70° C.	well preserved	well preserved	fairly well preserved	well preserved	fairly well preserved

The qualities I and II can thus bear comparison with the finest sorts econd rate rubbers.

he writers explained also to the natives that they allowed an appre-le quantity of rubber to be lost by abandoning the branches that are and that by barking and pounding them, 100 lbs. of abandoned bran- would yield 8 lbs. of rubber similar to the fine sorts called " Ben-as " and also " Mozambiques."

This system of extraction, which, in order to be productive, should arried out by machinery, offers the great advantage of allowing the tment of branches that would otherwise be wasted, of plants with thin stems and of those [illegible] growing kinds for which this method more advantageous th[illegible] appl[illegible]

In order to ensure th[illegible]re of Madagas[illegible]m the point of view he production of rubb[illegible]e first thing to be done is to st[illegible]ncl[illegible] ation and destruction [illegible]e spo[illegible]ous indigenous [illegible] of om ease the production of the country ; the existing [illegible] of the tiplied or the best America[illegible]nds should be intro[illegible]ding the a in Malaysia. The latter [illegible]s th[illegible] nstance, could give as much as [illegible]337 and [illegible] cre,

with lianas, calculating on 400 plants per acre, one could not have than 107 to 116 lbs. per acre at the utmost. But the fact must be in mind that the experiments made of transplanting Heveas as w Cearas and Castilloas have not yet given conclusive results and th the other hand the development of a plantation of indigenous r bearing species in Madagascar seems likely to give good results.

133 - Rubber Examined at the Imperial Institute (1).

1. — Rubber from Ceylon.
2. — Rubber from Papua.
3. — Rubber of *Hevea confusa* from British Guiana.

Bulletin of the Imperial Institute, Vol. X, No. 3, pp. 380-383; 386-388; 3 London, 1912.

1. *Ceylon Rubber.* — At the Experiment Station at Peradeniya, C a series of tapping experiments was carried out to determine the re value of excision and incision methods as applied to *Hevea brasil* the tapping being performed 1) by the knife only (incision), 2) b pricker only (incision) and 3) by a combined method using both and pricker. The results of the chemical examination of the r which was analysed at the Imperial Institute, proved that the dif methods were nearly equal. Two specimens obtained by making half-spiral incisions were practically identical, though the crêpe res from the third method was a little inferior to that obtained by th two. The biscuit obtained by the third method was a little su to that due to the first.

In 1906, several new rubber-yielding species of Manihot (*M.* *toma*, *M. heptaphylla*, and *M. piauhyensis*) were discovered in Braz were stated to be superior to *M. Glaziovii* and therefore introduced e mentally into a number of countries. In Ceylon, *M. dichoto* stated to thrive better than the Ceara tree (*M. Glaziovii*). Sa of rubber from young trees of the first species were prepared a Experiment Station at Peradeniya and analysed at the Imperial tute; the rubber in composition was of very fair quality (84.6 per of caoutchouc), although the percentages of protein (5.7), inso matter (4.3) and ash (2.9) were rather high.

2. *Rubber from Papua.* — The chief rubber-yielding plants i nous to Papua are *Ficus Rigo* and [illegible] species of vine, which has so fa been determined. *F. Rigo* is a t[illegible]hich is chiefly found in the district, where it is known by the n[illegible] "Maki;" it furnishes ru of good quality, whi[illegible] is collec[illegible]atives for export. Ex mental plantations [illegible] tree have [illegible]d in the island. The [illegible]d by the vine [illegible] also of very [illegible]uality.

[illegible] information on this subj[illegible] also: *Colonial Reports, Miscella* [illegible] *Scientific and Technical Departmen* Rub[illegible] London, [illegible] (Ed.

Rubber of Hevea confusa *from British Guiana. — Hevea bra-*
is is not indigenous to British Guiana, but it has been introduced
ntation purposes and promises to do well in the Colony. Several
species of *Hevea* are, however, natives of the above-mentioned
y, and of these the most widely distributed is *H. confusa* (Hattie
l). The rubber furnished by this plant has hitherto been regar-
; of little commercial value, but the present sample, which has
nalysed at the Imperial Institute, though deficient in elasticity
enacity, is of very satisfactory composition.

Caoutchouc	92.3 %
Resin	1.8 ,,
Protein	4.9 ,,
Ash	1.0 ,,

he yield per tree is small, even under cultivation, (British Guiana,
ca, Java). At Buitenzorg, twenty-year-old trees, with a girth
n 40 to 50 inches breast high yielded only 0.35 oz. of dry rubber
ee.

The Cultivation of Cigar Tobacco with Special Reference to Java.
Bulletin of the Imperial Institute, Vol. X, Nos. 2 and 3, pp. 148-263 and 465-470.
ndon, 1912.

he United Kingdom imported in 1910 no less than 111 257 544 lbs.
manufactured tobacco, valued at £3 435 493, of which only 1 471 102
alued at £45 987, was derived from British sources (almost exclusively
i North Borneo, India and Jamaica). The writer is of opinion
would be desirable to extend the growing of tobacco in the British
es; he considers the question under its various aspects and as a
bution to its solution he gives an account of cigar tobacco culti-
and preparation as it is carried on in Java.

ll the tobacco estates in Java are situated in the Vorstenlanden or
palities (of Djocjokarta and Soerakarta or Solo) and are mostly
ed near Klaten in the principality of Soerakarta. The chief es-
subscribe a definite sum per annum to the Department of Agricul-
or the upkeep of the Tobacco Experimental Station at Wedi or of
eneral Experimental Station at Salatiga, which includes a special
co section with a laborato[illegible] Klaten.

and Tenure and Labour. [illegible] Vorstenlanden all the land is look-
on as belonging to th[illegible]ce, and [illegible]fifth of it is regarded
pertaining to him p[illegible], or [illegible] Parti[illegible]mployed to meet the
istrative and other [illegible] of the pr[illegible]ay, the [illegible] (incl[illegible]
the use of the royal [illegible] et Par[illegible] ring [illegible] of [illegible]
let to the tobacco under[illegible] all [illegible] [illegible] [illegible] the
, with certain rights to th[illegible] [illegible] [illegible] [illegible] [illegible]
ifth of the land let to a t[illegible] [illegible] [illegible] [illegible] [illegible]
el," the intermediary through [illegible] [illegible] may

either cultivate the land himself, or re-let it to the planting com
The remaining four-fifths of the land is divided into two parts, one of
is planted for the company by the peasants, and the other is res
to the peasants on the estate, for their own cultivation. The two
are interchanged annually so that the benefits of a rotation of at leas
crop, usually rice, with the tobacco are obtained.

The services the peasant must perform on the land which he culti
include the preparation of the soil, the preparation and care of the
beds, the planting out of the tobacco seedlings, the care of the gre
tobacco and its irrigation. The estate lessees provide and pay spe
for the transport and application of manure, the construction of
drains, deep tillage, the harvesting and transport of the tobacco
and for the curing, fermentation and grading of the tobacco. The
of pay for coolies are about one shilling a day.

Climate. — The tobacco season in Java lasts from March to De
ber. The plants complete their growth in about 2½ months. Th
mate is moist throughout the whole year, though there is a relat
dry season from June to October. The temperature is nearly unif
rarely inferior to 20° C. or superior to 35° C., with variations of the mo
mean temperatures of only one or two degrees.

Soil. — The upper layers of the soil are composed almost exclus
of very fine sand and clay of volcanic origin. This material is comp
essentially of andesite, which contains from 0.5 to 1.34 per cent. of po
The soils at the foot of the volcano Merapi contain 0.05 to 0.10 per
of total nitrogen, 0.01 to 0.17 per cent. of phosphoric acid and 0.0
0.12 per cent. of potash; they are all the richer in phosphoric acid
potash the nearer they are to the volcano.

Cultivation. — Leguminous crops are grown on the land for se
years before it is used for tobacco. After a certain time sugar-cane fol
tobacco. At the end of December, when the tobacco has been harve
dams are erected round the field and the latter is flooded for rice c
vation. The rice has been sown in seed beds forty or fifty days previ
ly and the young plants are transferred to the field. About a hun
days later the rice is ripe and ready for cutting (January to May).
land is then harrowed twice, ploughed and again planted out with
and after another hundred days (June to October) these operations
repeated for a third crop of rice (November to March). So that t
crops of rice are obtained between two tobacco crops. The ave
yield per crop of rice is 7228 lbs. [illegible] 2.97 [illegible] piculs per bouw), and o
bacco 1445 lbs. (20 [illegible] per bouw [illegible] there is not enough wat
permit of rice cultivation [illegible] dicarpound nuts, or "dry ri
are [illegible] being very important
[illegible] als, etc., has been const
[illegible] e supply.
[illegible] rd harvest the rice straw i
the [illegible] nd partly as fuel for sterili
[illegible] dug out (150 ft. apart, a

t wide and 4 ft. deep); they are generally made in a new place every the land is then ploughed and manured and ploughed again twice, which a second system of parallel gutters is constructed. These out 10 in. wide and 1 to 2 ft. deep and lie about 30 ft. apart, running it angles to the first set, which is made in the direction of the slope land. The whole field is then surrounded by a ring-drain. The thus formed are ploughed again three times. The land is then d out for planting, pieces of split bamboo indicating the positions bacco seedlings are to occupy, at intervals of 1 ft. 6 in. along rows part.

t this stage the middle two feet of the three-foot space is worked patjol (a kind of broad mattock) to a depth of 1 ¼ to 1 ½ ft.; the re- ng 6 in. on either side of the bamboo marks is worked to a depth ., except close to the bamboos, in order to allow the young plants it more firmly. Another method of working the soil consists in ng it up in strips and leaving the subsoil of each alternate strip to the air for some time. Whichever method is adopted, on the the working of the soil is done with great care.

lanuring. — Practically the only manure used is street sweepings r poor) and the rice straw that is ploughed in. Green manuring be advantageous, but it cannot be carried out economically as the are already occupied almost continuously by rice or tobacco. The o crop refuse is not used as manure because the commendable se obtains of burning all this refuse every year to avoid spreading diseases.

eed Beds. — The seed beds are prepared in mid-July, end of July id-August, so as to have tobacco in three stages of development. il selected for seed beds is ploughed several times and worked over d, exposing it as much possible to light and air as a means of avoid- mosaic" disease. The beds are made 12 ft. long by 4 ft. wide and igh, and are provided with drainage and irrigation ditches. Water plied in them during the first five days to flood the seed beds and y ants. Three days before the seed is sown rice straw is spread e beds and after it has lain one day to attract insects it is burnt d each bed a bamboo framework is made, on which mats can be l to afford shade when necessary.

he beds are well smoothed ov[illegible]d flattened, and the seed sown rate of 0.5 gram per bed : f[illegible]t five days the beds are watered; eight days thinning ou[illegible] ru[illegible] plants are raised ch bed, or about 60 p[illegible] S[illegible]sider this too high ecommend 20 per squ[illegible] ithe[illegible] the beds prayed with Bordea[illegible] (fa[illegible] nch th he shade is removed [illegible] ing [illegible] of om me onwards the duration [illegible] the eth day the plants should [illegible] are not replaced unles[illegible]

The young plants are planted out in about thirty-five to forty d after sowing, on thoroughly watered ground, and are watered daily the first seven days.

The rest of the cultivation consists in breaking up the soil round plants whenever it becomes hard, in heaping soil round the bases of stems, in removing and burning weak or diseased plants and replac them.

Harvesting. — In general the tobacco is not topped, nor are suckers removed. The leaves are picked singly in the early morni when they are poorest in starch, beginning with the bottom leaves, a rule eight bottom leaves, ten middle and six top leaves are obtain the three kinds being kept separate also in all the successive operatio The leaves are then hung up to dry in the drying sheds, which are ki well ventilated, but which are allowed the least possible amount of li

The dry leaves are made up into bundles of fifty to fifty-five le each, and placed to ferment in rectangular heaps of twenty layers, e consisting of about 500 bundles. After about five days the temperatu rises to 60° C. The heaps are then unpacked and with the contents every two of them a new heap is made containing forty layers. T unpacking of the heaps when their temperature rises to 60° C. and remak of larger ones, is repeated usually three more times, thus five in all, c being always taken to place the bundles that were on the outside of previous heap in the middle of the new one.

Grading. — The sorting of the leaves is done first according to quali and then according to colour. Six classes are made: 1) complete th leaves of good texture and free from stains; 2) as above, but show fungoid disease stains; 3) broken leaves, subdivided into four qualiti 4) leaves showing pressure marks; 5) leaves showing spots; 6) th leaves.

The graded tobacco is made into "hands" consisting of 30 to leaves and the hands are packed under pressure into bales of about lbs. in weight. The tobacco is shipped from Semarang to Amsterda

The yield of finished tobacco is about 1260 lbs. per acre, and the av age price is about 1 shilling per pound.

Diseases and Pests. — Throughout, a very careful watch is kept insect pests, and the village children are paid to collect and destroy th *Phytophthora nicotianae* is very p[illegible]lent. The diseased plants are rooted and burnt, and the holes a[illegible] 2.97 with a mixture of lime and monium sulphate s[illegible] plants are sprayed w Bordeaux mixture, [illegible] her outbreak has occur a ne[illegible]

[illegible]me is a bacterial dise which [illegible], or which has not been wi ed s[illegible] d fermentation is proceed Beside[illegible] widespread, but on the w does very

The Fuller's Teasel.

LEMORE, W.: *Royal Botanical Gardens Kew. Bulletin of Miscellaneous Information*, 7, pp. 315-350. London, 1912.

iis article is the result of a request received at Kew from a firm ds respecting the increasing difficulty of obtaining a regular sup- teasels, and it also gives bibliographical notices concerning the tion of this plant in Great Britain and the United States.

has not been found possible to construct a machine capable of the same finish to cloth as is obtained by the use of the teasel.

commerce, these heads are known by different names: "king "(the central head, which terminates the main axis and is always gest); "queens" (found at the ends of the principal branches); es," or "buttons" (borne by minor branches). One English firm he teasel heads into 70 different sizes previous to selling them to tomers.

ance has perhaps the largest acreage under teasels, and French- heads fetch the highest prices, but this plant is also cultivated in d, the United States and Germany.

England, land is hired from farmers by Messrs. North for the cul- 1 of one crop at the rate of £6 per acre per year. Ground which will e good wheat is considered most suitable for teasels and, when e, a crop of wheat is followed by teasels, the soil being well worked, manured. Seeds are drilled into the ground in March of one year succeeding year's crop. The ground is weeded in June and again , when the plants are thinned out. In October, a further clean- the ground and loosening of the soil takes place.

t year, in March, the ground is loosened and the plants finally thin- ing left about three feet apart each way; any gaps caused by death 1 damp or frost in winter are filled up. In June and July (the ig season) a strict watch is kept in view of a possible attack by llars. The harvest takes place in August and September. The heads d in sheds with open sides and thatched roofs, which are erected fields. The heads mature at different periods, so the plants have gone over several times. They are cut with about six inches of ied up in handfuls, threaded on long poles, and hung in the sheds ut five weeks to dry. They are then taken into a barn, sorted, d up into bundles for sale. The price of a bundle varies from 35s.

The annual value of the [illegible] and is estimated at £15 000; while the va[illegible] 1911 from France 681, from Germany [illegible] 349.

garding teasel cultu[illegible] two critical ; one is during wint[illegible] inclem- ather, and the other [illegible] of wet r may wholly or partia[illegible] this, cultivation has been su[illegible] direction n made, but not on a su[illegible] an opinion formed as to the financial re[illegible] experience

one would be inclined to consider that such a scheme would be a fina failure, for the gross average income from an acre of teasels is ab £70 and this after the ground has been occupied for 18 months, while necessary expenses of building portable houses, soil renewal, etc., w be very heavy.

There appears good reason to suppose that better results might obtained by moving the cultural area from Yorkshire and the west counties to Essex and Hertfordshire and perhaps Norfolk and Suffo Experiments might be conducted with a view to obtaining a race w would stand the winter well and mature earlier. Seeds should be se ted from well grown heads. Experiments ought also to be made in or to save the ground for one summer by sowing seeds thinly on a sm area of ground; a crop of wheat could be taken from the rest and teasels planted out in autumn.

Cultivation in France. — In France, the plant is found to th best in a light, gravelly soil with a southern aspect. The seeds are so in spring and the young plants well thinned out. In August, they transplanted into rows about 12 to 15 inches apart and are kept weeded during the winter. Sometimes the teasels are sown in the pl where they are to remain and a cereal is grown with them, so that a re may be obtained from the ground during the first year. In the follo spring, as soon as the plants have attained a height of from 20 to 2 ches, a number of the side shoots are removed, eight or twelve being for each plant. Harvesting is commenced when the leaves begin to or to turn yellow. When dry, the heads are packed in boxes contain from 25 to 100 each, all of uniform size and colour. In 1909, 3690 a of teasels were grown in the three districts of Bouches-du-Rhône, V cluse and Seine-et-Oise, and the 40 380 cwt. of heads produced were va at £51 237.

Cultivation in the United States. — In America, it is usual to the seeds in drills 3 to 3½ ft. apart with a thin crop of corn. grain is gathered and the straw left standing to afford protection snow during winter. The plants are eventually thinned to eight or inches apart in the rows, and harvesting takes place in a similar ma to that adopted in England. The average crop is 100 000 heads per (about the same as in England) and the medium price in New Yor from 90 cents to one dollar a thousand, though it may drop to 50 ce or rise to two dollars. The holes are 2.97 are said to weigh ten pou Teasel growing [illegible] industry in the State New York [illegible] (Clackamas County).

The c[illegible] pence a pound for d heads a[illegible] nd.

Fruit and Vegetables in Alaska.

S. Department of Agriculture, Annual Report of Alaska Agricultural Experiment tions for 1911. Washington, 1912.

t the Sitka Experimental Station a hardy strawberry has been pro- by crossing the cultivated variety with a wild native Alaskan plant, ew variety appears to be well adapted to the climatic conditions of egion, and gives far better yields than either of its parents.

the apple orchard, planted in 1903, ripe fruit was produced for st time in 1911, possibly owing to the exceptionally fine weather ; September and early October of that year. The fruiting varie- ere all of crab descent.

herry and plum trees continue to prove unsuitable to the prevail- nditions ; but currants, raspberries and gooseberries do well and are ented by a number of varieties.

With regard to vegetables : variety trials of potatoes, cabbages, lowers, lettuces and radishes were continued ; the results show that crops, with regard to both quality and quantity, may be obtained nly in the coastal region of Sitka but also at the interior stations mpart and Fairbanks.

The Passion Fruit in New South Wales.

IRN, W. J. in *The Agricultural Gazette of New South Wales*, Vol. XXIII, Part 11, 975-979. Sydney, November 2, 1912.

he passion vine flourishes on many classes of soils (some extremely , and has been found specially useful for interplanting in young plantations in the Cumberland, Penang Mountain and Gosford cts (N. S. W.). Plants may be raised from seed sown in February he vines planted out in August or September in rows 10 ft. by 12 ft.

The young vine is trained up a stake with a single stem to a height ut 5 feet ; then it is allowed to throw out two to four leaders, which ide to run either way along two horizontal wires about 6 in. apart. second year after planting, two good crops of fruit are obtained mmer and winter — and by pruning away the summer crop when own, a large yield is obtained in winter when other fruits are scarce. ield is maintained for about four years, after which the plants l be grubbed. The vineyards will never succeed in regions exposed t, and the land should be limed [illegible] generously treated fertilizers to obtain good [illegible] remarkably fine t, and keeps well in a [illegible]

Investigations and [illegible], on [illegible] roduced on ne Vine by Grafting [illegible]

VIALA, P. and PACOTTET, [illegible] ge. — *Revue de Viticulture*, Vols. XXXVI[illegible] 8, 976, 978, 9 and 982, pp. 685-690, 5-7, 33-3[illegible] 1 and 511-7. Paris, December 21, 1911 ; Ja[illegible] 29, September and 26, October 10 and 31, [illegible]

VERMOREL. Enquête sur les effets [illegible] *Syndicats des Agriculteurs France*, pp. 362-373, and 423-428. Paris, [illegible] and [illegible] 1912.

1. — The theories which have been promulgated during th few years respecting the reciprocal influence of stock and graft h no wise modified the practice of reconstituting vineyards by pl them with American vines resistant to phylloxera. Neverthele importance which recent scientific work seems to attach to que of the reciprocal action of stock and graft was not unknown to vine- ers.

Vine-growers have always been a little afraid as to the effect gr might have on their vines and the quality of the wines, and all the since reconstitution with American vines has made grafting ge

The writers, like other vine-growers, have for a number of made observations in the vineyards as to the influence exerted by th ferent stocks on the various grafts. These observations have been trolled in a comparative and more scientific manner, by experimen the different experimental plots set apart for this purpose.

The following is a short summary of their important studie

" Observations and experiments made in the vineyard and nuously in the experiment field, not for two or three years alone extending over a period of fifteen years, show that the variations th to be due to grafting do not exist and have never existed.

" The numerous facts which we have ascertained by means of parative observations in the course of this work, have also shown the characters and qualities of high-class and of ordinary wines are ret or improved by grafting French or European varieties on Ame stocks."

2. — In 1908, the " Société des Agriculteurs de France " app ed a Commission of Enquiry regarding grafting and its consequ The work of this Commission was the centralization of the greatest po number of documents and the control on the spot of the facts coll

They began by drawing up a question schedule, which was throughout France to viticultural syndicates, associations and soci as well as to the chief vine-growers, for the purpose of collecting a opinions and known facts for or against grafting. In March 1909 replies to these questions were divided as follows :

Two hundred and twenty-nine were in favour of grafting.

One hundred and [illegible] answers were to the effect that was no differen[illegible] a th[illegible] nd non-grafted vines.

Twenty [illegible] the holes a[illegible] 2.97 [illegible]ines were more liable to grapes run[illegible]g fo[illegible]

Ten re[illegible] of resistance to fungu eases, *i. e.* [illegible] pruning or staking.

Nine [illegible] n these vines were inf in quali[illegible]

Thu[illegible] and thirty-seven answers unfavourab[illegible]lity of the vines was concer It was thus [illegible]ch had given rise to the contradictory opin[illegible] verified on the spot.

he delegation entrusted with this duty made its first tour in the west and south, from the 8th to the 22nd of August 1909, and came following conclusions:

From the data collected, it is clearly seen that the objections made ting are not sufficiently well-grounded to prove any degeneration cific modifications due to this practice, as usually effected; pro- the requisite conditions of affinity and adaptation are present, and he other vital necessities of the vine are not neglected."

he Commission proposed continuing its studies during the course summer of 1910, in Burgundy, Champagne and Franche-Comté, as prevented owing to the very unfavourable weather. But from formation received from these regions, and which came from ab- y reliable sources, it appears that no facts were discovered which way made it necessary to modify the above- mentioned conclusions. he Commission therefore proposed to the Viticultural Section of ciety that the enquiry should be suspended for the present.

Manuring Vineyards with Tobacco Refuse in Hungary.

zo, IMRE.: Szőlőtrágyázás dohányhulladék trágyával. — *Borászati Lapok*, Year Nos. 50 and 51, pp 778-780 and 795-797. Budapest, December 8 and 14, 1912.

his is a study and discussion of the problem of manuring vine- with tobacco refuse according to the experiments made in 1912 vineyards of Count Batthány at Szabadbattyán.

his problem is interesting, as the question of manuring becomes more urgent in the sandy vineyards of Hungary, where, owing insufficient quantity of stable manure, it is sought to introduce manures rich in organic matter, such as dried pigs' dung and town the use of which however is more costly than that of tobacco

he vineyards in which the experiments were carried out were di- into five groups, each of which contained five plots of 1712 square each. All of them, save two, were planted with Riesling grapes. en the rows of vines furrows about 14 inches deep were opened, ich the tobacco refuse, completed by artificials, was placed. The es were applied in three different doses: medium, heavy and very

n order to compare the effect [illegible] of the phosphatic es, superphosphates and [illegible] atter also in or- study the effect of th[illegible] position of the o refuse. The quan[illegible] re calculated basis of the compo[illegible] that of the ity of pigs' dung [illegible] these two es is shown by the [illegible] obacco refuse thus con[illegible] the dried dung, but more organic [illegible] he year 1912 did not p[illegible] vine, so that esult of the experiments wa[illegible] as was expected.

TABLE I

	Water per cent.	Organic matter per cent.	Nitrogen per cent.	Phosphoric acid per cent.	Po per
Tobacco refuse	10	60	2.3	0.4	
Dried pigs' dung.	13	56	1.9	2.2	

Nevertheless it shows that tobacco refuse is useful for the vine, espec as a source of humus; it is particularly suitable, with a compleme phosphatic and potassic manures, for sandy soils where vegetatio vigorous.

The writer recommends the following quantities per acre per an for four years, which are not excessive.

1st year: 6154 lbs. of tobacco refuse, 309 lbs. of superphosphate 112 lbs. of 40 per cent. potash salts.

2nd year: no manure.

3rd year: 243 lbs. of superphosphate, 112 lbs. of 40 per cent. ash salts and 93 lbs. of sulphate of ammonia.

4th year: 61 lbs. of sulphate of ammonia.

The writer is of opinion that in cases when farmyard manure is sc tobacco refuse, owing to its high content in organic matter and t even action, is one of the most economical and useful manures, espec in the sandy mountain vineyards.

140 - Irrigation of Olives and Its Effects.

SOMMA, U. L'irrigazione all'olivo e sua azione. — *Le Stazioni sperimentali agr italiane*, Vol. XLV, Part 12, pp. 930-939. Modena, 1912.

Experiments carried out at Bari, upon old trees in full bea on light, permeable soil (calcareous tufa) irrigated with slightly brac water twice, at the beginning of June and the beginning of August means of a basin of 10 ft. radius round the trunk of the tree, contai 135 gals. of water. Fertilizers per tree: 66 lbs. of stable manure, 2¼ of mineral superphosphate, 2.97 lbs. of sulphate of ammonia, 1 lb. of phate of potash. Pollard the holes a

Average per [illegible] ng the four years 1909-1

Leaves and [illegible]	lbs.	41.4	31.2
Olive cro[illegible]	lbs.	87.8	64.5
Average w[illegible]		6 lbs. 50z.	6lbs.7
Olives per [illegible]		1668	1782
Proportion [illegible]		17.4	18.6
Percentage o[illegible]		42.217	41.947
Percentage of [illegible]		57.783	58.053
Percentage of fa[illegible]		23.295	22.959
Oil from 100 fresh oli[illegible]	gr.	38.809	37.598

clusions. — 1) Irrigation promotes the development of the foliage of the tree: thus vigorous pruning is necessary. 2) The proportion of the leaves and the wood removed by pruning gives a larger percentage of leaves in the case of irrigated trees (up to 23 % compared with 15 % in non-irrigated). 3) Irrigation promotes a larger crop of fruit (up to 21.4 lbs. per tree per annum). 4) There is less falling of the fruit because the growth is more regular. 5) The olives are larger, and their water content is a little increased, but at the same time the amount of oil present is always a little larger.

As a whole, the experiment showed that it would be most advantageous to introduce irrigation of the olive into Apulia. If fresh water were available the results would possibly be still more satisfactory.

The Uses of *Roystonea regia*.

Usos Economicos de la Palma Real. — *La Hacienda*, Vol. VIII, No. III, pp. 91-93 Buffalo, N. Y., December 1912.

The royal palm (*Roystonea regia* Cook) grows wild throughout the Antilles and also in South Florida, Mexico, Central America, and in the northern part of South America. It is especially abundant on damp soil, such as is suitable for tobacco cultivation. In the west of Cuba it is found on land which was formerly cultivated, but has since been abandoned. The trunk is often 70 to 85 ft. high, with a diameter sometimes as much as 24 inches. The wood is considered unsuitable for constructive purposes, but the external layer of hard wood is much used for making sticks, sticks. stakes, fences, posts, tables, coffee mortars, [illegible], and the partition walls of houses. The most useful portion is the "yagua," a kind of coriaceous bark. The large terminal leaves have a complexicaul petioles 4 to 9 ft. long and as wide as the circumference of the stem. Every three or four weeks, a leaf falls; this is damped, pressed by means of weights, and dried. The dried petioles are sold in Cuba and provide the best packing material for export tobacco. The fibres supply a fibre from which ropes and string are made. In Cuba, the "yagua" is also used in the construction of the poorest houses. The terminal bud is edible, but its removal causes the death of the tree. *R.* [illegible] one of the most elegant palms for planting in avenues.

The Scientific Application of Fertilizing [illegible] when Planted Out.

[illegible]NER, J. PH.: (Prof of Agric. [illegible] Application rationnelle Engrais aux Arbres à plant[illegible] [illegible]onale d'Agricul- de France. — *Le Progrès* [illegible] 793-795. Villeche (Rhône), December [illegible], on [illegible]ich [illegible]ame [illegible] application of fe[illegible] [illegible] young trees they are planted o[illegible] [illegible] writer, a vexed question, [illegible] considers the following [illegible]

1) The situation of the roots of [illegible]
2) The nature of the young tr[illegible] [illegible] diseases.
3) The method of action of differen[illegible]

An account is given of the following method. The chemical
lizers (phospho-potassic) are well mixed with the superficial soil,
is to be put first of all in the trench; then comes a layer of ordina
8 to 12 inches deep, next the nitrogenous fertilizer, if this is used (n
of soda, sulphate of ammonia, guano, etc.), and finally, the last
of soil to fill up the trench.

The soluble nitrogen in nitrogenous fertilizers finds its way
ually to the roots; thus a nitrogenous fertilizer of a very caustic n
is no longer in direct contact with the roots where it might be har

The organic manures are placed in an intermediate layer, n
too deep nor too superficial, and without being in direct contact
the roots they do not incur any risk of loss or of drying up; they a
sides rendered powerless as propagators of fungus diseases.

The phosphoric acid and potash contained in less mobile art
fertilizers are directly within reach of the roots and can be absorb
they become capable of assimilation.

The writer adds that is is well to give the young tree for about
years, in some form or other: 25-30 gr. (about 1 oz.) of nitrogen,
gr. (1 to 1¼oz.) of phosphoric acid, 40-45 gr. (about 1½ oz.) of po
25-30 gr. (about 1 oz.) of lime, which about corresponds to: 7 oz.,
trate of soda, 7 to 9 oz. of basic slag, or the corresponding weig
superphosphate, and 3 oz. of potassium chloride. If the soil is no
poor in lime, the lime contained in the slag suffices. The fertil
in the amounts calculated for three years, should be applied on the su
and at the end of this time should be dug in as deep as possible, so
they may reach the roots.

143 - **Forest Fires in the United States: Their Causes, Extent
Control.**

1. PLUMMER, FRED. G.: Forest Fires: Their Causes, Extent, and Effects, with a Sc
of Recorded Destruction and Loss. — *U. S. Department of Agriculture, Forest S
Bulletin* 117, pp. 39 + figs. 6 + plate 1. Washington, 1912.

2. PETERS, J. G.: Forest Fire Protection under the Weeks Law in Co-operatio
States. — *U. S. Department of Agriculture, Forest Service, Circular* 205, pp. 15 +
Washington, 1912.

3. GRAVES, H. S.: Protection of Forests from Fires. — *U. S. Department of Agri
Forest Service, Bull* + plates X. Washington, 1912.

4. ADAMS, D. for the Prevention and Control of
Fires, as B forests. — *U. S. Department of A
ture, Fores* plates VI. Washington, 191
5. SILCO the National Forests. — *Y
of the U* 415-424 + plates XXVII-X
Washi

I. — ve caused an average an
loss of abo tion of trees worth at the
least $25 00 crops, buildings, and other
provements to ons more. To these must
added enormous lo ruction of young tree growth, d

n of the soil, damage to water courses and adjacent property by ter and flood, interruption of business, and depreciation of prop- By an inquiry into the causes and extent of such fires we are able ize in some degree the magnitude of these losses.

ie first compilation of forest-fire statistics for the whole United was by Prof. C. S. Sargent for 1880, published in the Tenth Census , Vol. IX,. In 1891 the Division of Forestry of the Department iculture collected statistics of forest, prairie, and crop fires. The cle Fire Tables for the year 1900 report a loss of $2 246 000 from fires, compiled by insurance companies. In 1900 and 1901 the n of Forestry made a second attempt to gather statistics upon which e from forest fires might be estimated. New data have been ob- from: (*a*) reports of fires on National Forests; (*b*) reports of State rs from 17 States; (*c*) supplemental reports of forest supervisors ; outside the National Forests; (*d*) reports of lumbermen's asso- s; (*e*) newspaper accounts from press-clipping bureaus of recent (*f*) the Forest Atlas (this is the central map system of the Forest : and contains manuscript maps); (*g*) investigations of Forest ;, particularly in even-aged forests, to determine by stem ana- he dates of old burns. Before this mass of material could be used ord of each event was reduced to a common standard, and a card was devised, as shown below:

Sample of U. S. Forest Service fire record.

Kind of fire: Forest - Brush Land - Prairie (Check Mark Proper Term).

tion { State, ... f { County, ... e { Near . . . . . | Date of Fire { Year, ... Month, ... Day (or Days), ...

in of fire, ... burned, ... Timber burned, ... board feet. e of timber burned, ... Value of other property burned, ... ber of buildings burned: . . . houses, . . . barns, . . . mills, and . . . others. ber of lives lost, . . . Number stock lo . . . horses, . . . sheep. arks: . . . . . striking di . . . tion . . . . . above information is furni . . . . . e, ... (Go . . . .

ls the value of a fire . . . t, it is ne- y that there should be . . . the causes es. The following schen . . . orest Service ommended for general . . . and logical.

Classification of the causes of forest fires.

- Forest Fires
  - Preventable: caused by man
    - Intentional
      - *Incendiary.*
        - Maliciousness or wilful negligence.
        - Contempt for the law.
        - To cover crime.
        - To drive game.
    - Unintentional
      - Sparks or ashes from engines
        - *Railroads.*
          - Passenger, freight and work engi
          - Steam shovels and plows.
          - Logging engines.
        - *Sawmills.*
          - Permanent mills.
          - Temporary mills.
          - Portable mills.
          - Donkey engines.
        - *Brush burning.*
          - Clearing lands or rights of way.
          - Slash, rubbish, or garbage burnin
          - Stubble or meadow burning.
          - Light burning.
      - Generally from uncontrolled fires
        - *Campers.*
          - Construction campers.
          - Recreation parties and picknicker
          - Miners and prospectors.
          - Hunters and fishermen.
          - Stockmen, including branding and tion fires.
          - Berry pickers and nut gatherers.
          - Cruisors, surveyors, and river drive
          - Smokers, children, tramps, etc.
        - *Miscellaneous.*
          - Fires from burning buiklings, or prairie or other fires, if the origi original fire is not known. If origin determined it is classified accor
          - Sparks from chimneys and stacks an those classified under "Rail "Sawmills." Blasting, except the classification "Brush Bu tric wires, unless accom ing.
          - combustion, either c chanical.
  - *Unknown.*
    - es fires the cause of which is n nable with reasonable certain
  - *Lightning.*

most accurate data on the causes of forest fires are from the re-
ept on the National Forests.

Average per cent. of causes to total number of fires the U. S. National Forests from 1906 *to* 1911 *inclusive.*

Railroads	26.7
Lightning	17.5
Incendiary	4.5
Brush burning	4.8
Campers	16.9
Sawmills	1.1
Unknown	20.7
Miscellaneous	7.8

umber of conditions in the forest contribute either to the incep-
to the spread of fires.

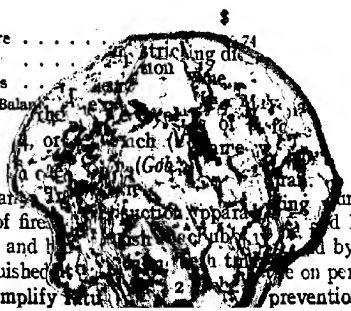
Contributory forest causes: natural - litter, etc.; artificial - logging refuse, etc.; insects.

: climate also must be considered with other variable factors a
itory cause of fires.

Contributory climatic causes: droughts; hot seasons; hot waves; warm winds.

– The forest fire season of 1911 marked the first year's operation
ion 2 of the Weeks law. This section authorizes the U. S.
ry of Agriculture to co-operate with States in protecting from fire
ested watersheds (catchment basins) of navigable streams.
e States which received Federal aid under Weeks law in 1911 were
the total amounts expended by them and by the Govern.ment
; follows :

	$
States Expenditure	
Federal "	
Allotment to States	
Unexpended { Balan	



ere are reported mar[illegible] under the
law. Hundreds of fire[illegible] hunters,
by careless smokers and [illegible] by patrol-
d promptly extinguished [illegible] on permanent
ements that will simplify [illegible] prevention. But

in addition to these tangible results, which have been apparent fro start, the educational value of the work, although not measurabl been far-reaching. Except in a few States, 1911 was the first year any systematic State patrol of the forest was conducted ; it marke general extension of the State organization co-operating with the F Government. The most effective work of the patrolmen was in wa persons met in the woods of the danger of setting fires, and info them of the fire laws.

3, 4, and 5. — The U. S. Forest Service has made various pu tions on forest fires prevention and control. The following an chief points as set down by the Chief Forester, H. S. Graves.

For the successful protection of a forest from fire there are neces

a) the elimination , so far as possible, of the causes of fires ;
b) a proper organization of the forest, including the disposal of slas opening of roads, the construction of trails, etc.;
c) an adequate supervision ;
d) facilities for fighting fires.

As to the principles of fighting forest fires, they are recognize sentially as those of fighting fires in cities. The following are of importance :

a) quick arrival at the fire ;
b) an adequate force ;
c) proper equipment ;
d) a thorough organization of the fighting crew ;
e) skill in attacking and fighting fires.

LIVE STOCK AND BREEDING.

144 - Warble Flies.

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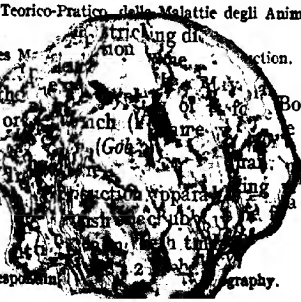

Distribution and *Life* [illegible] Bots (*Hypo-ovis* Geer and *Hypo*[illegible], or [illegible] Diptera, Oestridæ. Both a[illegible] (*Gob*[illegible] Railliet (1) *H. bovis* is fou[illegible] ow only *la* has been met with in [illegible] commu-

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e numbers refer to the correspon[illegible] raphy.

nication from the Government of the Commonwealth of Australia continent is free from warble flies. On imported cattle in some warbles were observed, but the animals were quarantined and the destroyed.

An official of the United States Bureau of Animal Industry ob ved that the female of *H. lineata* deposited its eggs, about 1 mm. in len by means of a blunt ovipositor on the hair of the cattle, most freque preferring the hair of the forelegs. As many as six eggs have been fo on one hair. Every egg has an appendage, which adheres to the The eggs contain fully developed young larvæ. Egg-laying takes p during the warmest part of the year.

Cooper Curtice (Bibl. 1) found in 1890 young larvæ of *H. lin* in the throat of cattle, and it is probable that the eggs are licked off the animals and thus find their way into the cavity of the mouth, wh the larvæ hatch out. They migrate thence into the muscular tis of the gullet and moult after some time. Later, in the winter mon warble larvæ are found in the adipose tissue of the spinal cavity and wards spring they appear under the skin. Here they moult twice, ducing abcesses. They bore an aperture through the skin, which at serves for the introduction of air; then, when they have completed bot or maggot stage, as a passage by which they leave their host.

They then fall to the ground on which, or just under the surf they turn to pupæ and emerge, after from three to six weeks, as per sexually mature flies.

In the Southern States of the United States the first warble appear in the spring (Bibl. 28); in Europe their appearance is limited the summer months from June to August. The fully developed wa fly has only rudimentary mouth parts; it consequently takes no f and lives but a short time.

What has been said of *H. lineata* holds good for *H. bovis*, with exception that until lately no investigator had been able to ascert whether this oestrid also laid its eggs on the hair of cattle and wh part of the animal it preferred. In the summer of 1912, Gläser (Bibl. however, was enabled to observe an unfecundated female of *H. b* laying eggs. He set the fly on the back of a bull, and saw after some t that this fly drove its [illegible] into the coat of the animal. He t found, on a spot [illegible] centimetre in extent, eight e and on another [illegible] metre, upon which the fly also stopped [illegible] on the back of the bull, rather close [illegible] only when the hair rubbed the [illegible] vation it is very proba that unde[illegible]oped and fecundated males of *H.* [illegible] cattle and, like *H. linea* attach them[illegible]s view is the fact that the e of both spec[illegible]dage which serves for fast ing the eggs to [illegible]l. 5) supposes that *H. b* also lays its eggs b[illegible] hair of the feet, because he obs

at in Ireland warble flies swarmed especially round the feet of ani-

pinions are still divided as to how the larvæ of *H. bovis* find their nto the body of the cattle. Hinrichsen had (according to Railliet) y in 1884 discovered larvæ of these flies in the throats of cattle. (Bibl. 14) examined, during 1910 and 1911, in the Hamburg ter house, the gullets of 9326 head of cattle and found 2013 of them ining Hypoderma larvæ. In April the affected gullets were 9.29 nt., in May 1.75 per cent., from December to February from 28.39 42 per cent. Other investigators have found larvæ in the midriff, spinal cavity and in the muscular tissue under the skin. Never- s Stub (Bibl. 2) sets up the theory that the larvæ found in the throat t attain full development, but perish in the body of the animal. ding to him the larvæ of *H. bovis* can only develop normally when have bored a passage through the skin from the outside. He found, amining the hides of slaughtered animals, minute passages which right through the hide, each of them containing at its inner extrem- young warble larva in the first stage of development (after irst moult). Several of these passages from the outside reached to about the middle of the hide. Gläser (Bibl. 18), on the other hand, s on the strength of his observations that passages are to be found , starting from the inside, do not go right through the hide. He s the existence of fine passages through the hide, but says that Stub d out his observations in March, namely at a time when possibly e larvæ have already bored through from the inside to the outside. (Bibl. 13) is of opinion that the larvæ enter the animal by the gullet, through the hide from the inside as far as the roots of the hairs, from this point to the outside the opening is completed indirectly flammatory processes. In support of this view Peter in his paper several figures showing cross sections and a longitudinal section uch passages.

Carpenter (Bibl. 5, 6, 7) has been conducting experiments for some s past in Ireland, with the object of ascertaining how *Hypoderma* e enter the bodies of cattle. He kept during the years 1904 and 1905 calves always covered with a cloth together with other calves on a ure; in the summer of 1905 four other calves were provided with rings for their limbs also, and, in addition, a [illegible] completely covered kept on the pasture. [illegible] to the next ng. The average numb[illegible] lves protected lothing differed very [illegible] rotected ani- s. Only the complet[illegible] nd in spring e quite free from th[illegible] he larvæ in it was not possible [illegible] the calves been completely clothed [illegible] In the summers of 1906 [illegible] nter provided ral calves with leather [illegible] with other calves a pasture. The muzzles [illegible] alves from licking

themselves and thus affording warble larvæ or their eggs the mea passing through the calves' mouths into their bodies. During the and whilst feeding their necks were fastened in such a manner to a of wooden frame that the animals could not lick themselves, be which, the fore-legs were clothed. Nevertheless, in the spring of five of these muzzled calves had 10 to 27 warble larvæ on them; was completely free. Two calves which had worn muzzles in bore no warbles in 1908. In the summer of 1908 other six calves kept muzzled on the pasture. Instead of clothing their forelegs, a of apron formed by a sack was hung round the animals' necks to pre them from licking their forelegs. The above-mentioned wooden was also used. In spite of these measures, in the following spring all protected calves had an average of 4.66 warbles, against an aver of 4.33 warbles on the nine unmuzzled control calves. In the sum of 1909 five muzzled calves were kept on the pasture. Over the lea muzzle a large wire one was placed so as to prevent the calves taking larvæ through the openings in the leather muzzle. The other pre tions were the same as had been previously taken. Together with t five calves fifteen control calves were sent into the same pasture. of these latter calves had in the spring of 1910 an average of 6.33 bles. Three of the muzzled calves had only one warble each, one three and one had four. Carpenter adds that by means of the do muzzle at least a partial protection against the larvæ was obtain The results would probably have been better if the wire muzzles had b immediately used with the leather ones. But the former arrived at the end of May, so that the calves were protected during the warm last week in May only by the leather muzzles. — Carpente continuing his experiments.

III. *Kind and extent of injury caused by warble flies.* — There be no doubt that warble flies injure cattle in various ways. In the place their presence disturbs grazing cattle. In the Pedernales valley in North America it has been observed that out of fear of wa flies the herds leave off grazing during the warm hours of the sum days and seek refuge in the river.

The injury that the animals suffer from the larvæ can consist lower milk yield and in the depreciation of their flesh and hides. loss in milk is valued at [illegible] as 20 per cent., but this estimat cannot be accurately [illegible]

The injury [illegible] inflammatory modificati it undergoes [illegible] the larvæ; the inflammat is revealed [illegible] nective tissue and rend the meat [illegible]

The [illegible] Krause (Bibl. 17) endeavoured [illegible] damage in Germany. sent a quest[illegible] anneries requesting them answer the ques[illegible] in hides. About 50 wo gave the desired [illegible] of which, together with

tics of the animals slaughtered in 1910, Krause calculated that in year about 24 per cent. of all the hides in Germany were damaged arbles: 31.03 per cent. in North Germany and 9.08 per cent. in Germany. The total number of damaged skins amounted to 94. Assuming the depreciation in North Germany to be 3*s.* 9 3/4 *d.* n South Germany 3*s.* 6 3/4 *d.* per hide, the total loss in Germany 10 was £178 142 8*s.*

The English Board of Agriculture (Bibl. 12) was informed by a tan- that out of 132 000 hides which had been worked, 40 000 were dam- by warbles. In another tannery only 1500 hides out of 20 000 were ged. The depreciation amounted to from 2*s.* 6*d.* to 5*s.*

Sayets and Vaney (Bibl. 4) state that in Forez (Dep. de la Loire, ne) on examining some herds, warbles were found on 4 per cent. cattle aged three years and upwards and on 52 per cent. of the one two-year olds.

Rasquin (Bibl. 23) found that in several Belgian slaughterhouses 13 per cent. of the hides were damaged by warbles. He calculated otal number of damaged hides in Belgium to be 48 720 per year. depreciation per skin is valued at 2*s.* 1 3/4 *d.*

According to De Vries (Bibl. 19) from 30 to 33 per cent. of the cattle olland are affected by warbles.

From the United States no recent figures are available. In the year an agricultural paper (Bibl. 1, 28) stated that from January to July 50 per cent. of the cattle delivered at the Union Stock Yards in go had warbles.

n Canada (Bibl. 29, 30) warble infection is especially considerable provinces of Manitoba, Saskatchewan and Alberta. It is customary nce the purchase price by two dollars for every head of cattle found ing from warbles.

V. *The destruction of warble flies* has not hitherto been rendered com- ry by legislation in any country except the German State of Ol- urg (Bibl. 17), in which a ministerial decree of March 11, 1910, orders a the district of the Wesermarsch-Herdbook Association the destruction rbles is to be carried out. The Chamber of Agriculture of Oldenburg in the years 1910 and 1911, a circular to the agricultural and milk ol associations, enquiring as to the success which up to then had ded the destruction of the pest by striking di- reports announce or partial success; 6 repo- ny success; 9 ts state that a conclusi- awing to the ness of time during w- With few tions all the reports he experi- and demand that the extended he whole Duchy of Denmark was the first cou- ade to con- warble flies by private in- ying Co-op- ve Association began the c- n 1902, and has d it on since then (Bibl. 17). ed staff examines

the herds a fortnight before they are sent out to graze. The larv
removed by a steel instrument. Immediately before being sent t
pasture and several times in the course of the summer the animal
again examined and the larvæ removed.

The following table gives data on the cost of the work and on th
sults obtained.

Year	Stock	Head of Cattle	Number of Larvae	Co pe head of
1906	Old stock	3 756	4 016	
	Cattle bought	286	4 980	0,45
1907	Old stock	3 810	7 100	
	Cattle bought	439	5 855	0,52
1908	Old stock	4 076	1 123	
	Cattle bought	186	2 448	0,39
1909	Old stock	3 614	1 116	
	Cattle bought	261	3 926	0,43
1910	Old stock	3 348	369	
	Cattle bought	209	3 506	0,35

In Ireland, Carpenter (Bibl. 5, 6, 7) began in 1907 the destructio
warbles at the Agricultural Experiment Station of Ballyhaise. The ave
number of warbles per [illegible] cattle in the herd sank from 10.77 in
to 4.44 in 1908. [illegible] still 132 head of cattle which had
on the farm [illegible] the holes a[illegible] In 1909 the average num
of warbles [illegible] 7.52. It is worthy of
that all th[illegible] the centre of the farm
on averag[illegible]es than those which
constantl[illegible]

The [illegible]rding to Boas (Bibl. 2
the Danish [illegible]h warble destruction was
tised.

In Germany [illegible]ermination of the warble p
was formed in 19[illegible]e publishes a periodical and supp

ntific investigation on the life history of the warble fly. At the ions of the German Agricultural Association (Deutsche Landwirt-Gesellschaft) in Hamburg in 1910 and at Cassel in 1911 there ecial exhibits showing leather with warble holes, skins with fresh es and warble larvæ in their various stages of development.

the Municipal Bureau of Public Health in Berlin a volunteer it for the investigation of the life history of warble flies has been ed. For the defrayal of the expense, the Imperial Ministry of rior has contributed up to now about £200, several representative eather industry about £250 and other groups of people interested question about £150.

France the French association for the destruction of warble flies nded in November 1910, provisionally for 10 years. The members scriptions of from 16 s. to £20. The association publishes a period-taining papers on warble flies. In No. 2 of the above periodical an article intended as a guide for elementary school teachers in essons on warble flies.

e association has provided the veterinary school at Alfort and the of tannery in Lyons with a steer affected with warbles to be used stigations. It has further induced the horse gelders (Hongreurs) Department of Allier to undertake the campaign against warbles rate of 1s. 8*d*. per 100 larvæ. It appears also that school children a reward, somewhat higher than the above, for the larvæ they

The association has also addressed a circular to the directors ultural schools, to the teachers of agriculture and to the depart-veterinary surgeons begging them to give assistance to the work roying warble flies. At the request of the Association the Minis-griculture has appointed an official for the investigation of the life of the warble fly and has granted the Association a contribu-about £40.

Sweden in the elementary schools instruction is frequently given warble fly and its destruction. It is believed that in consequence teaching the pest has somewhat abated.

e Ministries of Great Britain, Belgium, Switzerland, Austria, ited States and Canada have hitherto limited their action to in-ig farmers by means of publications on warble flies.

om Russia, Norway, Holland, [illegible] gary there are only publications on the subject [illegible] ver, the Council iene of Live Stock deal[illegible]

e introduction of war[illegible] revented by mmonwealth Quaran[illegible] for Queens-as proposed to the [illegible] this Act tringent in respect [illegible] vernment ke an amendment of [illegible] sideration.

145 – **Anaplasmosis in Cattle** (1).

La tristeza en los bovines. Una nueva forma del mal. — *Revista de la Asociación del Uruguay*, Year XI,I, No. 9, pp. 684-686. Montevideo, 1912.

An extract from the account furnished by Dr. Lignières, Dir of the Bacteriological Institute, and Chief of the Cattle Breeding S sion of the Ministry of Agriculture of the Republic of Argentina.

Dr. Lignières showed some time ago, that inoculation with *Piro ma bigeminum* did not confer immunity from *P. argentinum*, and the spite of successive transmissions during a period of some months, two parasites retained their own special characteristics. Similar st ments are made in South Africa and elsewhere : thus the individu of these two causes of pyroplasmosis has been established.

From the end of 1911 until April 1912, Dr. Lignières had occa to study several abnormal outbreaks of gall-sickness (" tristeza ") i in inoculated cattle and in creol cattle, which are naturally immu On reproducing the disease in the laboratory by means of the bloo infected animals, he obtained a new form of " tristeza," caused b hæmatozoon different from those hitherto found in Argentina.

Under natural conditions, the new disease usually does not o alone, but is generally accompanied by *P. bigeminum*, and someti by *P. argentinum*. It appears as a chronic affection, with high, someti intermittent, fever, severe anæmia, great debility and diminution entire loss of appetite.

The examination of the blood of infected animals at the time w the disease was at its height, revealed a relatively large number of p sites in globules stained by the Laveron or Giemsa methods. These p sites were completely spherical, deeply and uniformly stained ; they erally occurred only in one or two globules and were situated near periphery of the latter. The parasite is certainly an *Anaplasma*, and studies being prosecuted by the writer will show whether or not it is i tical with *A. marginale* Theiler.

Dr. Guth has observed coccus forms in Uruguay, which are prob to be referred to anaplasmosis ; the latter disease was carefully stu at Sao Paulo by Dr. A. Carimi, Director of the Pasteur Institute at place. In North America the existence of anaplasmosis has so far been definitely proved, though it probably occurs there, since Mes Smith and Kilborn d[illegible] first publications dealing with T fever, coccus fo[illegible] at the periphery of the globu

Dr. Ligni[illegible] the holes a[illegible] plasmosis by means of the bl or organs o[illegible] agency of *Margaropus roplus* (the [illegible] *minum* and *P. argentin* obtained [illegible] is a far more serious ease than [illegible] cattle die, sometimes resisting t[illegible] onths.

(1) See No. 810, [illegible] 43, *B.* Jan. 1913.

inoculation against *Piroplasma bigeminum* and *P. argentinum* is ttle effect against *Anaplasma*.

Dr. Lignières insists on the necessity of adopting special sanitary ures to prevent the spread of anaplasmosis, which seems only to exist gentina in limited areas in the north of the country.

- A Study of the Normal Blood of Carabao.

DYNTON, WILLIAM HUTCHINS: in *Philippine Islands Department of Public Instruction, reau of Agriculture, Bulletin* No. 21. Manila, 1912.

The writer used for his researches 25 buffaloes from 2½ to 6 years Some of them were draught animals that had been immunized st rinderpest. The greater portion of the other animals had not immunized.

The body temperature of the animals experimented upon was taken for several weeks before the examination of the blood began. The l to be examined was always taken from a vein of the ear, after the ad been well cleansed and dried with alcohol.

A short description is given of the methods followed in the investi- ns, as well as several tables of the results, which may be summar- as follows:

1) In the circulating blood of apparently normal buffaloes upwards o years of age, an average of 6 057 520 red blood corpuscles were d per cubic millimetre of blood.

2) The average content of haemoglobin was 92.6 per cent.

3) In every cubic millimetre of blood there were on average 89 leucocytes.

4) The average specific gravity was 1.0532.

5) The ratio of the blood corpuscles to the plasma was 29.1 to 70.9.

6) The time necessary for the complete coagulation of the blood 3 minutes 16 seconds.

7) The following five kinds of leucocytes were found:

a) Lymphocytes; average diameter 7.3 μ; average number ubic millimetre: 5049, or 48.5 per cent. of all the leuocytes.

b) Large single nucleus leucocytes; average diameter 10.8 μ; age number per cubic millimetre: 484, or 4.6 per cent. of all the leu- tes.

c) Polynuclear leucocytes, [illegible] 9.4 μ; average ber per cubic milimetre: [illegible] the leucocytes.

d) Eosinophil leucocytes, [illegible] μ; average ber per cubic millimetre, [illegible] e leucocytes.

e) Mastzellen; av[illegible] number per c millimetre: 115, o[illegible]

147 – **Use of "Vindobona Pulp" on a Large Scale for the Ensi of Sugar Beet Pulps, in Hungary.**

KOPPELY, GEZA.: A "Vindobona pulpe" nagybani alkalmazása répaszelet beer lésénél. — *Mezőgazdák*, Year XIX, No. 21, p. 177. Budapest, November 1912.

Three years ago the writer introduced Bouillant's "Lacto Pulp" i the farms belonging to the Hatvan sugar factory and employed it w success for the better preservation of the ensilaged beet pulps. M. He Chief of the Station of Plant Physiology and Pathology at Magyaró was then occupied with the question, and described the good results of experiments of pure cultures in milk serum for the preservation of silaged pulps. This encouraged the Halvan sugar factory to use greater scale the "Lacto pulp" imported from France.

The favourable results of the first year's experiments induced writer to inform the agricultural public of the use of the pure cultu in milk serum and to call the attention of the sugar factories to th He has since adopted the "Vindobona pulp" prepared at the M laboratory in Vienna, which is also a pure culture in serum, legally g anteed(1), and he reports briefly upon the results he obtained in 1 with the ensilage of 1300 railway car loads of fresh pulp, on which "Vin bona pulp" was sprayed whilst being put into the silo. This treatm diminished by about one quarter the loss of weight due to excess of ferm tation which in previous years had attained to 34 per cent. It also proved the quality of the pulp, which was more relished by the live st than the untreated pulp.

In order to compare the loss in weight between the treated the untreated ensilaged pulp the writer, assisted by M. Arthur Zaitsek chief chemist of the Royal Station of Biology and Stock-feeding, c ducted the following experiment:

On November 24, 1911, two silos were filled: one containing 1 cwt. of well pressed pulp treated with "Vindobona pulp", the ot 1649 cwt. of pulp equally well pressed but not treated. On July 1912, the first silo yielded 1247 cwt. and the second 1107 cwt. of p Consequently the loss of pulp in the first was 388 cwt., or 23.8 per ce and in the second 542 cwt., or 32.9 per cent. The loss of weight in t experiment was thus the same as that previously observed by the wri who warmly recommends all farmers to use the "Vindobona pul treatment.

148 – **Some D ms in Sheep.**

ARKELL, T. nt Station, Department of An Husbandry,

Accordi etween horned and ho less sheep, nditions develop bo but the fem

(1) For details of t see M. BUSITS-JOSZSEF's article Közlelek, Year 22, No.

ood found that the F1 generation arising from the mating of horned
rnless sheep, by breeding *inter se* produced about 75 per cent.
and 25 per cent. hornless males, while among the female offspring
F1 generation 75 per cent. were hornless and 25 per cent. were

e writer states that Darwin's and Wood's data do not correspond
to reality, for sheep according to the condition of the horns they
ay be divided into three categories:
) Breeds with both males and females heavily horned (as the
Horn and Lonk).
) Breeds with the males only horned (Merino class; frequently
males are found, and at times females with some signs of horn
).
) Breeds with both sexes hornless (Downs and many coarse-
sheep, the most prominent of which are Lincoln, Cotswold and
er).
e writer has discovered by actual measurements that little appre-
variation exists in the size of the horns of Dorsets under similar
ons of feed and care. This, however, does not hold true for Me-
ep. They are most variable even within the same breed or strain.
ales carry heavy, others short light horns, and in many breeds
e hornless. All authorities on sheep concur that Merino ewes
rnless, yet many practical Merino sheep raisers have admitted
writer that a mere scab, or very short loose scur, may appear every
d again from the horn pits of some Merino ewes. The writer him-
nd at times a short hard knob protruding from the horn pits of
ewes. In 53 out of 128 American Merino ewes he found these
or excrescences, and 5 of these had besides scabs or short scurs.
stration seems to have a decided influence on the development
s. This question, however, needs further investigation.
e writer has (in *Science*, N. S., Vol. XXV, No. 897) together with
port, and combining the results of other investigators with those
rown breeding tests, formulated the hypothesis that horns in sheep
nted a typical sex-limited character. According to this hypothe-
re is an inhibitor in the sex chromosome which weakens or neut-
the horn determiner; the hypothesis assumes further that the male
sheep is heterozygous (simplex) [illegible] only one sex chromo-
while the female sex has two [illegible] (duplex). The
or for horn formation will [illegible] male sheep and
in the male. Further the [illegible] ion are not
y strong in all breeds, or [illegible] hes in this
t a vigorous determi[illegible] (*Gob*[illegible] ker deter-
H1 (Rambouillet ty[illegible] rminer is
nted by h. In the zyg[illegible] ble of pre-
g the development of hor[illegible] determiners
r H1H1) or one (Hh or [illegible] however, the
tion of horn is much re[illegible] horn determiner

are lightly horned, those with two heavily horned. Only the d
inhibitor occurring in the female zygote is capable of suppressing
pletely the development of horn when there is only one determiner
or Hrh) ; it cannot suppress it when it contains two determiners
If there are two weak determiners (HrHr) the above mentioned e
cences or knobs, scabs or scurs in the horn pits arise. When the
miners (H or Hr) for the formation of horn are lacking, no horns a

For his breeding experiments the writer used Dorset Horns,
nos and South Downs, altogether 113 individuals. As common sta
for the study of horns the ratio of circumference to length was
The length of the horn was measured from the poll to the tip of the
once on the inside and once on the outside. An average between th
gives the length of the horn. The circumference is taken as close
poll as possible.

The tables appended contain all the combinations of deter
theoretically possible with the matings made. Further tables gi
formation on the crosses obtained and on the resulting F1 and F2 g
tions.

The results of the crosses can be well explained by the theory
writer. He however does not consider the problem of the inher
of horns in sheep as one finally solved ; he hopes soon to be able to
tribute further material towards its solution.

149 – Stock Census in Hungary for the Periods 1895-1911 and 191

KOMAROMI, SANDOR. Haszonállataink. — *Politikai Hétiszemle*, Year XIX, N
pp. 7-9. Budapest, December 29, 1912.

The Royal Hungarian Minister of Agriculture has just publ
a report of the stock census taken in the spring of 1912. The only
factory fact to be noted is an increase in the total number of pigs
other animals continue decreasing, as is shown by the following

	Total in 1895	Per 1000 inhabitants	Total in 1911	Per 1000 inhabitants	Total in 1912	P
Cattle			185 264	338.6	6 036 945	
Horses			1 431	109.6	1 960 000	
Mules and do				1.0	16 954	
Goats				18.1	313 839	
Pigs			24	351.3	7 409 801	
Sheep			7 719	421.5	7 168 054	

e increases (+) and decreases (—) are as follows :

	1895-1911		1911-1912	
	On the total number	Per 1 000 inhabitants	On the total number	Per 1 000 inhabitants
. . . . .	+ 354 679	— 26.6	— 147 319	— 13.3
. . . . .	+ 4 333	— 15.6	— 41 431	— 4.0
id donkeys	— 3 512	— 0.4	— 1 815	— 0.1
. . . . .	+ 44 991	+ 0.2	— 17 534	— 1.2
. . . . .	— 30 946	— 52.5	+ 993 377	+ 47.9
. . . . .	+ 170 935	— 50.0	— 529 665	— 35.3

om 1895 to 1911, the total number increased, except in the case , mules and donkeys. From 1911 to 1912, the pigs alone increased dependently of the more or less correct statistical data it may ted that, up to the present, the industry of cattle breeding as a has not shown signs of a capacity for improvement. A fresh proo is afforded by the stock census of 1912. The Ministry of Agricul as made every possible effort to change the situation, but so far, eeding alone has shown favourable results, while an improvement tle breeding will only follow the accomplishment of the measures for extending and improving the pastures, distributing breeding ls at reduced prices and avoiding the loss occasioned by foot-and- disease and other contagious diseases.

he total number of cattle in Hungary is not sufficient to meet the demand for milk, meat and exportation. Not only is the number s in this country less than that in France (52 per cent. of the whole er of cattle), in Germany (53 per cent.), in Italy (55 per cent.), in ark (57 per cent.), in Sweden (58 per cent.) and in Argentina (51.5 nt.), but it does not even remain stationary, having decreased from per cent. in 1911 to 44.2 per cent. in 1912. On the other hand 1 183 921 cattle were slaughtered [illegible] reduction of 288 683 or about 20 per cent., on [illegible] 254 956 cattle exported, or 167 351 (39 [illegible] o. The total er of cattle for the butche[illegible] ould have in- d in 1911 by 458 034, or [illegible] have been n by the stock census [illegible] he total in was lower than tha[illegible] In short, the live stock re[illegible] irements of country.

1. La ganaderia en Entre Rios. — *Gaceta Rural, Mercantil e Industrial*, Year VI, pp. 223-227. Buenos Ayres, October 1912.
2. The Province of Entre Rios in 1911. — *The Review of the River Plate*, Vol. XX No. 1092, p. 1138. Buenos Ayres, November 1, 1912.

The Province of Entre Rios, with its slightly undulating su traversed by the numerous, and to a great extent navigable, tribu of the Paranà and Uruguay Rivers, is eminently adapted to live raising, owing to its topographic and climatic conditions, to the e of its pastures and the good quality of its spontaneous grasses. culture also, favoured as it is by the natural fertility of the soil, constant progress. In 1911, 1 985 732 acres were cultivated ; of t

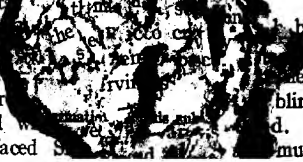
722 529	acres	were	under	wheat
880 747	,,	,,	,,	flax (for the seed)
163 605	,,	,,	,,	maize
210 772	,,	,,	,,	oats
40 456	,,	,,	,,	lucerne

Nevertheless the principal wealth of Entre Rios consists of live sto to the rearing of which 14 374 106 acres (out of the total surface 18 711 238 acres) were devoted in 1911. The numbers of animals in t year were the following :

2 226 352	cattle
534 114	horses
17 845	asses and mules
6 720 487	sheep
23 238	goats
36 961	pigs

The above figures, if compared with the returns of the " Censimen Agro-Pecuario " of 1908, show a falling off, due to the consecut droughts of 1909 and 1910.

Among the various breeds of cattle, Shorthorns are preferred, account of their precocity and of the excellent results attendant u their use in the improvement of the native (" criollo ") cattle ; neverl less in some parts of the [illegible] north they are losing ground and being replaced by [illegible] Herefords, which are hardier (es cially as regards the holes a[illegible]x and " tristeza " or redwat and stand the [illegible]les being less exacting in th requirement[illegible]



Among[illegible] breed holds the first p After man[illegible]s it has given origin variety wh[illegible]eat and wool, and valu in the impr[illegible]bling it to compete with famous and [illegible]d. In the northern dist the black-faced S[illegible]much esteemed.

mong horses, Hackneys, Anglo-Normans and English race-horses
d, and in the Montiel district the ancient " criollo " horse, of which
gh-breds exist, is bred.
mong pigs, Yorkshires and Berkshires predominate.
he principal products of the above animals (excluding horses)
at, or meat and wool. The dairying industry is of quite recent
and is still unimportant. The exports consist either of living
s (to Brazil and Uruguay) or of salt meat. There are in the pro-
six " saladeros," which in 1911 dealt with 353 075 head of cattle,
oung horses and 9 449 sheep.
he crossing of the native breeds has only recently been commenced ;
, however, already given excellent results. It is chiefly practised
departments of Gualeguaychu, Gualeguay and Victoria, and in
t part of those of Concordia and Uruguay, as this region is immune
ticks, which allows of Durhams being introduced.
he agricultural associations and the prize competitions that they
eld, have contributed a good deal to the improvement in live stock
ng and rearing.

The Encouragement of Horse-Breeding in Brazil.

ação do cavallo nacional. — *A Evolução agricola*, Year IV, No. XL, pp. 18-19. Sao
ulo, October 1912.

he National Congress of Brazil, after having determined the con-
s which entitle horse-breeding societies to receive Government
lies, have decided to appoint an official Stud Book Commission pre-
over by the Minister of Agriculture and entrusted with : instituting
eeping an official studbook for thorough-breds ; issuing certificates ;
ining the certificates and documents of animals which are to be en-
; keeping registers of the latter ; establishing the identity of such
ls, and deciding *ex officio* all questions respecting them.
ll imported thorough-breds are to be entered in the Studbook.
obligatory that all thorough-breds born in Brazil should also be en-
, if they are to enjoy the privileges granted by this law. Racing
ties are obliged, under penalty of forfeiting the subsidies of the Fed-
Government, to organize, at all their race-meetings, competitions
me-bred animals of 2, 3, 4 or m[illegible] trick[illegible] d[illegible] from April to June,
or animals of 3, 4 or more ye[illegible] [illegible]ion [illegible] the end of the
g season. Further, they mu[illegible] [illegible] [illegible] [illegible]ioned horses,
e federal capital, three an[illegible] [illegible] [illegible] [illegible] of not less
5000 milreis (about £31[illegible] [illegible] [illegible] [illegible] the winners
eceive 5 % of the sum [illegible] [illegible] [illegible] [illegible] [illegible]ered in the
ook will be allowed to [illegible] [illegible] [illegible] [illegible] [illegible] examined
he Studbook Commission[illegible] [illegible] [illegible] [illegible] [illegible] conform to
provisions of this law wi[illegible] [illegible] [illegible] [illegible] [illegible] Government
sidy of 15000 milreis (about [illegible] [illegible] [illegible] [illegible] from the payment
y federal taxes.

152 – The Breeding of Mules for the Market in Missouri.

CHANEY, WALTER S. — Market Mules in the Making. - *The Breeder's Gazette*, Vol. No. 25 (1621), pp. 1362 and 1366a. Chicago, December 18, 1912.

The mules foaled in the spring in the mule-breeding districts of Mi run with their mothers on bluegrass (1) pasture till weaning time in aut and during this time they get nothing besides mare's milk and grass. are generally sold in autumn to traders, at prices ranging from $ $ 125 (£ 10 5 s to £ 25 15s); the trader divides them into lots, selling best forthwith, while the others are put onto bluegrass again, often ge the run of corn (maize) stalk land also.

Only the better quality ones get some corn, oats and hay besides bluegrass and corn leaves. They are generally left out all winter. put on thick, shaggy coats in autumn. They are kept on bluegrass thr the next summer, and wintered on this and corn stalk land.

As two-year-olds the mules are bought mostly by small farmers, break them and work them for the season; of the price of a pair (to $ 500, i. e. £ 80 to £ 100), the trader gets only a small part, the being secured by a promissory note for twelve months at 8 per c interest, with a mortgage on the animals; this note he may sell to a ba he requires the money.

As three-year-olds, the mules are bought by dealers, who fatten t up before selling them in lots of twenty or more at Kansas City o Louis. There they are divided into several classes: sugar mules, c mules, miners, railroad mules, logging and turpentine mules, and other

The sugar mules must show great quality, being thoroughly bred; they are 3 to 6 years old, and 16 hands or more in height, weig 1175 to 1350 lbs.; they must have fine heads, sleak coats, clean li and be without blemish; mares are much preferred.

Cotton mules are practically like sugar mules only smaller, 14.2 to hands high.

Miners must be short legged and as heavy as possible; they may from four up to ten years old; slight blemishes do not matter, as the for slow hard work.

The log or turpentine mule is used in the forests of the south-ea States; size is the great requisite; in age they run from six to ten year

Railroad mules are big and strong, with plenty of room behind the sh ders; horse and ma[illegible] qual value for this purpose and a slight blemishes [illegible] the holes a[illegible]e.

153 – The S[illegible]e in India.

Low, C. R[illegible] Vol. VII, Part IV, pp. 331-342. October [illegible]

Attenti[illegible] the diminution in the num of cattle wh[illegible] in India.

(1) *Poa pratensis:* kn[illegible] smooth-stalked meadow-grass.

writer does not consider that there are any grounds for this state-
d gives in support of his opinion, statistical information regard-
cattle of British India (not including Bengal). Although it is
to ensure accuracy in the enumeration of cattle in India, yet
years past an ever increasing degree of accuracy has been secured,
ording to the writer, the probable error in most parts of India
now much exceed 5 per cent. The following table shows the
mber of cattle in each of a series of selected years, also the cropped
population throughout British India. To make this statement
the figure of the initial year has, in each case, also been expressed
nd that of each succeeding year has been reduced to the propor-
figure.

Progressive increase in cattle, cropped area and population in British India, excluding Bengal.

(All figures save percentages are in thousands).

Year	1885/86	1890/91	1895/96	1900/01	1905/06	1909/10
ped area	128 283	138 265	135 487	146 708	155 452	170 862
. . . . .	100	107.8	105.6	114	121	133
ber of cattle	53 921	73 375	78 581	84 434	91 130	94 903
. . . . .	100	136	145.7	156.5	169	176
ulation of nearest cen-	152 141	171 926	171 926	180 890	180 890	191 599
. . . . .	100	113	113	118.9	118.9	125.9

s clear that there has been an increase in the number of cattle,
ease being more rapid than that of the cropped area. The proof
ncrease is not only derived from [illegible] there is necessarily
o the number of acres which [illegible] ltivate, and as
pped area has been steadil[illegible] number of
as increased.
re is also an increase in [illegible] ore grass-
ving been brought under [illegible] rving as
grounds. The price of [illegible] eased de-
cattle and fodder being [illegible] the price
breeding of cattle is carri[illegible] tivators in their
partly by professional grazie[illegible] ther large grazing

areas. In the first case, the breeding animals are ill-tended and
and the tendency is to breed an inferior animal, whose only reco
dation is that it can live on a minimum of food.

More attention has, however, been paid to cattle of late in
rigated areas; and stall-feeding is here on the increase. The Gover
has wisely divided its forest areas available for grazing into
units and has fixed the number of animals that can be allowed
there.

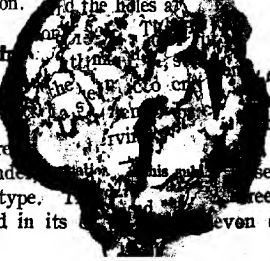
An increase in the number of cattle can only be expected when
feeding is more extensively practised under circumstances which
secure in all years an adequate supply of the necessary food. L
and Egyptian clover (*Trifolium alexandrinum*), under favourable
cumstances, will give a heavier yield of fodder than any other cro
veral varieties of millet give heavy yields of fodder under irrigati

Irrigated pastures, which are already beginning to find
are another alternative. Oil cake, which is now usually sent to Eng
would be a valuable adjunct to bulky fodder.

Were it practicable to bring the whole cultivated area of
under irrigation, the question of cattle-feeding would soon be s
but as this is out of the question, it is necessary to consider the best me
of dealing with areas where irrigation is not practicable. In such
tricts, millets and pulse are the main stand-by. In years of ord
rainfall, the supply of the former is usually in excess of the demand
the surplus is habitually sold, or wasted. An efficient method of st
is required, so that the surplus stock of one year could be kep
the next and thus a continual supply of fodder would be ensured.
periments at Berar have shown that *juari* stalks can be stored su
fully for more than a year, with little or no loss.

The grass in the Government Forests could be more economi
used by feeding, than by grazing, and the policy of the Central Prov
Forest Department is now "Cheap grass and dear grazing." This
artment is throwing open forest areas, where no effective deman
grass exists, to capitalists who are prepared to maintain a proper nu
of cattle of good type.

The Civil Veterinary Department has done much of late ye
control the inroads of infectious disease. In the year 1910-11, 30
cattle were inocu[illegible] head were treated otherwise th
inoculation.



154 – Af[illegible]

HOLM, [illegible] *the Union of South Africa*, Vol. I
pp. 6[illegible]

The [illegible]rtunately applied to all c
or mongr[illegible] but there is a pure breed
"Afrikande[illegible]sessing much prepotency an
fixed in type. T[illegible]reed owes its origin to, or h
influenced in its [illegible]even cattle imported to South

een found to be incorrect, for it is proved that pure Afrikander existed in the latter country at the beginning of the 19th century, the first Devons were imported. However, it is not unlikely that is an indirect relationship. During the sixteenth century, Por- had considerable trade with the Cape Peninsula; later, during the of the East India Company in the latter part of the seventeenth y, there was a good deal of traffic between the Cape and the In- Archipelago, and probably cattle were brought from Portugal and to the Cape. About the same time as Portuguese cattle were ship- the Cape, it is also probable that they were landed on the southern of England and therefore that they had some influence upon the bred in the counties of Devon and Somerset, from which the s of to-day subsequently sprang.

lthough the Dutch colonists imported their black and white cattle uth Africa, the writer does not think that the latter played an tant part in the creation of the Afrikander.

he Afrikander was first and foremost a "trek ox", and before ays of railways, these animals were used in transport waggons; ad a great influence on the breed, as active, strong oxen, uniform pe, colour and outline, were selected for these purposes.

he present Afrikander cattle are red, with long head, wide-spread- orns, very muscular neck, powerfully developed shoulders, slightly ssed back, muscular hindquarters, and powerful legs, with medium- hoofs and even, round, deep toes. It is a hardy breed, suited to the African climate and excellent for draught purposes. They are in coming to maturity; the oxen are full-grown at from six to seven of age and weigh 600 to 750 lbs. dressed carcass. The milk yield e cows is low, though individual animals are fair milkers.

In the summer of 1912, an Afrikander Cattle Breeders' Society was ed for fostering the breed and having it registered in the South Afri- Herdbook. The writer gives the standard of excellence and the scale oints then adopted. Some good illustrations elucidate the text.

Maize Distillery Residues as a Feed for Milch Cows: Influence on the Composition of the Milk.

FRISER, ISTVAN. Friss és szárított moslé[illegible]tei és tejszerum összetételére. - *Közlek*, Year 22, No. 83, pp. 2862-[illegible]ber 26, 1912.

Experiments carried out at the [illegible]imal Biology and ling at Budapest on the influ[illegible]ark yield and the position of the milk have sh[illegible]ater taken by ows has no influence on the [illegible]the five watery s tried, not one reduced t[illegible]milk below the l minimum.

In the 1912 experiments, [illegible] feeding value of and dried distillery residues, [illegible]as to whether wet dues, given to the cows in larg[illegible]the dried, had any ef- in diluting the milk.

In an 80 days' experiment, two six-year-old cows from the Im not in calf, were used; during the whole period the milk-yield re maine same. The experiment was divided into three periods: 1) dry fee wet feed, and 3) dry feed again. Each period was long enough to avoi after-effects of the previous one. Prior to the commencement of the e ment the cows had been on dry feed.

The first period lasted 12 days; each cow had 20 lbs. of hay, 1 to lbs. of barley, 1 lb. of pumpkin-seed cake and 4 ½ lbs. of dried maize d lery residue.

In the second period, of 49 days, while the rest of the ration rema the same, the dry residue was changed to wet residue, the amount being w to study the effect on the composition of the milk; the amount was: day, 55 lbs. per cow; next 13 days, 72 ½ lbs.; next 19 days, 60½ next 15 days, 121 lbs.; last day, 60 ½ lbs.

In the third period, bran was given instead of the wet residue.

During the experiment the following were determined: 1) water sumed; 2) yield of milk; 3) specific gravity and fat content; 4) sp gravity and refractive index of the milk serum, this giving indicatio to dilution. The water consumed during the experiment was:

	Cow I. lbs.	Cow II. lbs.
Period I: dry feed	60.2	58.4
Period II: wet feed (average). . . .	85.0	81.7
Period III: dry feed	53.8	49.4

Although the cows drank very little water during the wet feed p (no. I taking 5.7 lbs. and no II 2.6 lbs. per day on an average), the consumption of water in this period exceeded the average of the other periods by about 50 %.

The following are the figures for the composition of the milk d the experiment:

Period I: dry feed.

	Cow I.				Cow II.			
	Milk		*Milk serum*		*Milk*		*Milk se*	
	S. G.	% fat	refractive index	S. G.	S. G.	% fat	refractive index	
Max. . . .	1.0332			1.0279	1.0334	4.40	41.4	1.
Min. . . .	1.032			0267	1.0317	2.80	40.0	1.
Av. . . .	1.0			67	1.0327	3.81	40.5	1.

wet feed.

Max. . . .				7	1.0341	5.12	41.0	1.
Min. . . .	1.0				1.0318	3.20	39.5	1.
Av. . . .					1.0331	3.69	40.2	

ry feed.

Max. . . .	1.0346			3	1.0350	4.60	41.9	1.
Min. . . .	1.0327			67	1.0316	3.35	39.8	1.
Av. . . .	1.0336			0268	1.0335	3.99	40.2	1.

s thus seen that the specific gravity of the milk of both cows rose very throughout the experiments; the average fat content of cow II htly during the wet feed period, but not enough to have any practi- ificance; the refractive index and specific gravity of the serum hardly any change.

ese results show that the wet feed caused no diluting of either the the milk serum. Even when the cows were getting abnormal amounts ll held good: during the 14 days of heaviest feeding cow I took , and cow II 130 lbs. of the wet residue per 1000 lbs. live-weight; lowing figures show the composition of their milk in this period:

	Cow. I.	Cow. II.
Specific gravity of milk	1.0325	1.0334
Fat content of milk	4.22	3.49
Refractive index of serum	40.4	40.1
Specific gravity of serum	1.0269	1.0271

ie writer concludes that feeding large quantities of wet distillery does not affect the composition of the milk enough to have any ance in practice.

Cacao Husk as a Feed for Milch Cows.

as, J. E. Les Coques de Cacao dans l'Alimentation des Vaches laitières. — *Annales la Science Agronomique*, Year 29, No. 5, pp. 321-347. Paris, November 1912.

he writer gives an account of some feeding experiments which de with cacao husk for the purpose of ascertaining its effect upon ilk yield of cows. There were four experiments in all; in the first two lots, in the second three lots and in the third two lots: each nsisted of four cows. In the fourth experiment two lots, each of cows, were used. All the lots were as similar as possible.

Each experiment consisted of a preliminary, a principal and a uding period. Experiments I and II each lasted a month; the other experiments occupied a somewhat shorter time.

In every case a control lot was fed on rations of bulky food, maize- n and bran, while in experiments I and II the bran which the other received was gradually replaced by cacao husk; the latter was entirely tuted for the bran in the principal [illegible] lbs. of cacao husk w per day in the place of 3⅓ [illegible] short time 6 ⅘ f cacao husk was fed. In ex[illegible] part of the bran rations was replaced by [illegible] conclusion of iment IV an addition of 750 [illegible] husk was made e full rations containing the [illegible] ration.

During the time of the ex[illegible] ing was weighed the fat content of the milk [illegible] r's test.

The summary of the results o[illegible] is follows:

1. The cacao husk used not [illegible] ed the milk yield, decrease being as much as 20 p[illegible]

2. At the same time, it increased the fat content of the milk volume as much as 20 per cent.

3. The cacao husk had little effect on the fat content taken a whole, although this varied slightly, being sometimes greater and others less.

The writer states that Faelli (*Moderno Zooiatro* 1898) obtai increased milk yield and fat content by feeding cacao husk; he consi that husks of much fermented cacao decrease the milk yield less t those of little fermented cacao, such as he used in his own experime

157 - **Contribution to the History of Merino Breeding.**

SCHULTE IM HOFE, A. Zur Geschichte der Merino-Schafzucht. — *Mitteilungen der schen Landwirtschafts-Gesellschaft*, No. 50, pp. 690-692. Berlin, December 15, 19

1. *Introduction of Merinos into Europe.* — The Merino, whose or is Asia Minor, travelled by Greece and Italy to reach Spain, where spread all over Europe. As early as the second half of the 15th cent Edward IV brought some 3000 Merinos to England from Spain, but not succeed in permanently establishing them. There centuries later G III made further introductions, but the breed was again soon given u

The first Merinos were introduced into France in 1659, but their di bution was limited. New attempts were made in 1752. In 1785 the K of Spain presented Louis XVI with 334 ewes and 42 rams, which formed nucleus of the famous Rambouillet flock. Later, Spanish nobles prese the Empress Josephine with sheep from some of their best flocks.

Under Frederick the Great, in 1748, some Merino rams were impo into Prussia from Spain; in 1786 100 rams and 200 ewes were introdu In 1802 400 rams and 800 ewes were imported and distributed amon large number of farmers. During the winter of 1815-16, 900 Meri were taken from near Paris to Bornstedt near Potsdam; these sheep 220 rams and 680 ewes — were the foundation of the Frankenf (Brandenburg) breed, which was later increased by further importations fr France.

The first Merinos to be introduced into Saxony were 92 rams and ewes in 1765. In 1779, 270 more were purchased from Spain.

The Empress Maria-Theresa had 300 Merinos brought from Spain Hungary, and founded the Kaiserl. Royal flock. In 1784 the Emperor Jos brought over 100 [illegible] to found the flock of Mannersd in Austria, which the holes a[illegible]creased by the addition of 2000 oth

In Sweden [illegible] duced in 1715 and 1743.

2. *Introduc[illegible] to Australia and other British Colo* The first Merinos [illegible] Cape Colony by a Colonel under Dutch Governmen[illegible]er did not exceed 1000, while in 1 it had reached 11[illegible], the number of fine-woolled sh was down to 800 [illegible] the Boers undertook wool-grow and on various oc[illegible]erinos from England; recently t have obtained them [illegible] In 1816 the exportation of wool

0 lbs., in 1832 66 000 lbs., in 1836 372 000 lbs., while in 1880 it had ed 46 000 000 lbs.

In the Transvaal and the Orange Free State, the breeding of fine woolleep, which was seriously upset by the war, has since looked up again, to importations from the Cape. The total exports from the Union uth Africa in 1910 amounted to 120 million lbs., with a value of 0 000.

John Mac Arthur was the first to see how well suited were the condiin Australia for the breeding of fine woolled sheep. He crossed the sheep introduced by Captain Philipp in 1788 with 30 sheeep imported India in 1793 and others obtained later from Cape Colony. In 1804 Arthur brought several Merino rams with him from England. From period dates the development of sheep-breeding for wool in Australia. number of sheep rose from 20 million in 1860 to 106 million in 1899, fell to 53.7 million in 1902; in 1906 there were 71 million and in 1910 t 92 million, with a wool export of 792 million lbs., worth £30 000 000. The breeding of fine-woolled sheep in New Zealand owes its origin peated importations of Merinos from Australia. The first year in which exports are mentioned is 1840; in 1858 the number of sheep had to 11 ½ million, and in 1910 to 24 million, with a wool export of million lbs.

3. *Merinos in the Argentine.* — The first Merinos were introduced into Argentine at the beginning of the 19 th century. In 1910 there were illion in the country, and the wool export reached 330 million lbs.

4. *Breeding of fine-woolled sheep in German Southwest Africa.* — In 1891 lermann brought about 1500 sheep from the Cape to Kubub in German west Africa to start wool-growing; but the flocks were several times wiped out during native revolts. In 1908, however, their number 1 000, and in 1911 32 000.

To allow breeding to develop rapidly it is essential to have springs ently copious and persistent to establish fields of lucerne, so as to de fodder in droughty years. The veterinary organization must be ient to prevent infectious diseases becoming plagues. In the large ree flocks there should always be enough breeding animals to suppy farms. Again, larger importations from Australia must be made, and capital must be devoted to this ind[illegible]

Sheep-Breeding Experiments i[illegible]

nnual Report of Alaska Agricultural [illegible] 11, pp. 32 and 63-64 Washington, 1912.

From the experiments so far [illegible] odiak Experiment on, it seems that sheep breedin[illegible] ts on the south coast laska. In 1910, the Station p[illegible] incoln and Cotswold and a pedigree ram of each b[illegible] run with the flock the Cotswold kept for other exp[illegible]

Long-woolled sheep do best in [illegible] of Alaksa; the short

close wool of Merinos and their crosses holds the wet, which seriously im
modes the sheep.

The sheep grazed on the mountains in the autumn and early wi
of 1910. In the winter they were brought to the Station in excellent condi
and were kept on hay and silage for the remainder of the winter. By n
and in bad weather they were brought into the barn, but otherwise
kept out in an enclosure. They wintered very well.

At lambing time (June and early July) in 1911, there were stil
out of the 40 ewes, besides 20 lambs born in 1910. Three ewes died in
spring of 1911 from a too rapid change from dry feed to grass.

In the summer of 1911 37 lambs were born, and 31 of these lived
did excellently.

Alaka is attracting the attention of breeders from the United St
in 1911 one breeder imported 500 ewe tegs, and other importations are b
arranged.

159 - **The Goat Shows in Goat Sheds Organized by the Chambe
Agriculture of Baden.**

SARTTELI, J. E. Die Orts- (Stall-) Ziegenschauen der Badischen Landwirtschaftskam
— *Zeitschrift für Ziegenzucht*, Year XIII, Nos. 19-20 and 21, pp. 289-293, 310-313
327-329. Hannover, October 1 to November 1, 1912.

On the initiative of the writer, the Chamber of Agriculture of Ba
have adopted a plan for the improvement of goat-breeding in the Gr
Duchy by means of goat shows held in the goat sheds. The whole st
of the goat breeder is judged at these shows according to a scale of poi

The manner in which the animals and their sheds are kept is a
taken into consideration.

The scale of points is as follows :

I. — *For the animals.*

	No. of points
1. Breeding (fidelity to type, weight, descent, health)	0—3
2. Points (head, skin, hair, conformation of body, chest, width and depth of chest, back, belly, hips, limbs, general appearance) . .	0—3
3. Utility (good milkin[illegible]or breeding)	0—3
4. Evenness of all th[illegible]	0—3
[illegible]points for the animals . . .	0—12

II. [illegible] *other matters.*

1. Condition (esp[illegible]ng)	0—2
2. State of the sh[illegible]	0—2
3. Milk test record[illegible]	0—4
[illegible]r points for these matters . . .	0—8

prizes were given according to the verdict passed upon the animals : prizes were :

	Prize I.	II.	III.
For male goats	10 s.	6 s.	4 s.
For female goats	8 s.	5 s.	3 s.

f the breeder receives a minimum of 5 points under scale II, an ad- al 6*d.* for every such point can be added to the above prize.
In 1912, the first goat-show of this kind was held. In some cases, nimals were found to be badly fed and tended, but the writer hopes these conditions will be improved, and he concludes by stating the measures to be adopted for this purpose.

Chicken-Rearing on an Intensive System.

he Journal of the Board of Agriculture, Vol. XIX, No. 9, pp. 721-725. London, De- mber 1912.

An example of intensive chicken rearing is provided by a small g near London worked by Mr. F. G. Paynter ; the holding is a grass of 3½ acres, on fairly light and well-drained soil. Eggs of table s were purchased and hatched in incubators. The chickens were in foster-mothers for the first six or eight weeks, and afterwards l in runs up to the age of 12 or 16 weeks, when they were sold. The were 12 yds. × 100 yds., and held 100 to 120 chickens ; in each run small Sussex chicken "arks" provided sleeping accommodation ; were on wheels and could easily be moved about. Mr. Paynter ed methods of rearing previously tested by him for five or six years, ncubation, attention and feeding were all carried out carefully and odically. Only fresh material of the best quality was used for feed- and no cramming was practised. The quantity of food consumed g the season was : wheat 10 978 lbs., fine sharps 7 888 lbs., biscuit 3 257 lbs., barley meal 1 827 lbs., meat meal and green bone 1 586 bran 1 224 lbs., maize 703 lbs., rice 370 lbs., oatmeal 359 lbs., and fat s., also about 2 000 lbs. of mixed chicken feed.
It had been intended to start incubation in December, so as to sell first consignments of chickens in April, when prices are good; but arious reasons it was delayed, and hatching did not begin till the 13th ebruary. Incubation was stopped [illegible] ation [illegible].
Altogether 2 192 chickens were [illegible] May 28 and November a total of £301 5s. 3*d.* The [illegible] of as follows :

	£	s	d
Purchase of eggs (two [illegible] each)	31	13	1
Purchase of day-old chickens [illegible]	4	19	0
Oil for heating [illegible]	4	12	9
Food	142	4	3
Occasional outside labour . .	14	6	2
	£197	15	3

There was thus a margin of £103 10s. for the labour of the
holder, rent, deterioration of equipment, risk and interest on ca
there was also the value of the manure, which was regularly swe
The cost of the incubators, fencing, houses and all utensils re
£150 odd; a further £50 to £100 would be required as ready mone
purchasing eggs and food, before the returns began.

An essential feature of the management was that no adult birds
kept; this enables the holder to devote all his attention to the chic
and greatly reduces the risk of outbreaks of infectious disease.

The Board of Agriculture has arranged with Mr. Paynter to e
on his system this year in Cheshire, as a demonstration to the small hol
in that county.

161 – **An Export Trade in Eggs. Views of the South African In
Commissioner.**

The Agricultural Journal of the Union of South Africa, Vol. IV, No. 5, pp. 748-75
toria, November 1912.

The imports of eggs into the United Kingdom for the year
totalled over 19 000 000 great hundreds (120 eggs), value £7 96
The following are the figures in regard to the ten chief countries of o

Country	Quantities in great hundreds	Total values	Valu pe great hu
		£	s. d.
Russia	10 041 890	3 796 408	7 6½
Denmark	3 992 986	2 030 607	10 2
Austria Hungary	1 022 554	428 869	8 4
Italy	771 107	366 859	9 6
Egypt	687 335	222 853	6 5½
France	652 036	303 515	9 3½
Netherlands	7 364	282 805	9 3½
Germany	545	233 142	8
Sweden	89	157 067	9 1
Morocco	90	84 967	7 10

In 1911 the C[illegible] exported to the United King
twenty-two great h[illegible] which, however, realized 11s.
per great hundred, th[illegible]ce of any of the imported eggs.

e price *for the year* was about 8s. 4½*d.* per great hundred, the low-ing 5s. 4*d.* per 120 for Chinese eggs.
outh Africa imports considerable quantities of eggs, but this import ctically limited to the months between February and August, t it might be possible during the rest of the year to satisfy the home id and to supply an export trade.

s *imported into the Union of South Africa during the year* 1911.

	Quantity	Value
		£
January	14 400	60
February	495 446	2 163
March	3 405 839	15 072
April	3 699 190	14 302
May	4 623 564	15 813
June	3 835 056	7 701
July	650 810	1 928
August	78 252	220
September	5 000	27
October, November, December	nil	nil
Total	16 807 548	£ 57 286

ere are several large areas in South Africa where eggs and dairy e can be produced cheaper than in other countries which export rticles. The reason why these commodities are not produced port in South Africa is due chiefly to the difficulty of collecting opulation being very widely scattered) and of transporting them. ntries which export eggs are closely populated and often have ort food-stuffs. Still the advantages of a speedy and cheap collec-e so great as to enable those countries to compete on the large mar-f the world.

a account of the want of large markets, the South African agricul- have had to confine their efforts to the production of non-perish-roducts such as wool, mohair, ostrich feathers, wattle bark, and maize. During recent years fr[illegible]tion [illegible]wers have, with the aid of torage in ships, been enabled to [illegible]eir fruit, and a high indus-is thus been created. Trial [illegible] of butter have recently nade with satisfactory results[illegible]ich [illegible]ay an export trade s could be created during the [illegible] (Gol[illegible] when they are plen-n South Africa. The questio[illegible] probably be solved e aid of co-operation.

he Union-Castle Steamship C[illegible] to carry some trial ents of eggs from South African [illegible] er ton measurement, oultry, in cold chamber, at 50s. p[illegible] 2 [illegible]ce occupied.

Prices of eggs on the English market from November 1911 to January 1912.

Country of Origin.	Price per 120 eggs		
	Average	Highest	Lo
	s d	s d	s
England.	17 11	23 0	11
Russia	9 8½	12 0	7
Denmark	15 10	22 0	10
Hungary	10 0½	11 9	7

For the English market the colour of the eggs, whether wh brown-shelled, is a matter of indifference, provided that they a uniform colour and size in each box. The eggs must be cleanl *not washed*, and of a fairly good size and weighing from 13 to 16 trade hundred (120 eggs).

The writer has made himself acquainted on the English m with the best methods of packing eggs adopted by the chief exp countries, and recommends the cases used for the import of egg South Africa. These are lined with brown paper tarred on one and very dry oat straw. The eggs are packed in layers of five r sixteen and seventeen alternately, embedded in dry oat husks. Be each layer of eggs and the next one there is a double sheet of newsp oat straw and more newspaper. Four layers of eggs form a case. writer recommends placing a double division in the middle of the so that they can be divided by sawing into two half cases which are to small dealers.

162 – Mendelian Methods applied to Apiculture.

SLADEN, F. W. L. in *The Canadian Bee Journal*, Vol. 20, No. 12, pp. 357-367. ford, Ont., Canada, December 1912.

The study of Mendelism [illegible] the bee is hampered by several sp difficulties. Firstly mating [illegible]t be controlled in the ordinary Then there is the parthe[illegible]ic production of the drone. Thi the honey-bee is a highly sp[illegible]animal, and varies very little. T is some variation in si[illegible]n races being smaller than thos the west, but apart [illegible]ur of the upper or dorsal side of abdomen is the o[illegible]r that varies strikingly.

In the workers [illegible] the Abyssinian bee and in the ficial varieties know[illegible], the yellow extends over the t basal segments and [illegible] the basal part of the fourth segm The scutellum on th[illegible]part of the thorax is also yellow.

goldens, with the fourth segment entirely, and the fifth segment less, yellow have also been bred, but it appears that they do not rue. In Italians the three basal segments are bordered at the with black and the scutellum is darker. Italians from the Swiss ve the black bands wider than the Italians from the Ligurian while Cyprians have them narrower. Races with the abdomen black occur in Britain, France, Germany, Malta, and other places. e years the writer has been engaged in breeding a golden bee known British golden bee. This bee was extracted from crosses between blacks, Italians and American goldens. The golden character n isolated, and thenceforward it was found possible to maintain re golden breed, though many of the queens were mated with and produced hybrids. No attempt was made to increase the area golden colour, which in the queen extends much further back than worker. The factor or factors that produce a half yellow and ack abdomen in the worker produce an almost entirely yellow the queen. There is no difference in the gametes; the difference ly a fluctuation in the zygote caused by a difference in the food d in the larval stage. Since the work of breeding British goldens in 1902 a large number of pure golden queens have been bred; 1500 of them were kept until their young workers were hatched, tes were made of the colouring of these. They were golden and ediate. Not a single black worker was seen. Most queens pro- a considerable proportion of each type, but some produced all gol- and some all intermediates.

was evident that the queens that produced all goldens had been by a pure golden drone; in fact the most numerous golden families rom the matings that took place at the end of each season, when f the drones in neighbouring apiaries had been killed off, and from atings that took place in cold and windy weather and therefore to the apiary.

was also reasonable to believe that the intermediates were the re- the union of the golden queens with pure black drones (out of five s mated at a spot nearly two miles from the apiary four produced ermediates and one about nine intermediates to one golden). With- ubt the queens that produced goldens and intermediates had mated eterozygous drones. The proportion of the two types of workers considerably: from

ntermediates : golden : : 9 : 1 (one [illegible]

ntermediates : golden : : 1 : 30 (o[illegible]ch [illegible]

common proportion was [illegible]

ntermediates : golden : : 3 : 7, [illegible]

he proportion of goldens to i[illegible]en found to be the in the queen progeny as in t[illegible]y.

he worker offspring of about [illegible] t[illegible]mediate queens were ned and in every case they c[illegible] 2 [illegible]ldens, intermediates blacks, thus proving that segregati[illegible]den from black takes

place. The proportion of the three forms varied in different cases, the intermediates were usually in excess of the goldens and the bl In many cases almost every degree of coloration between golden and b appeared, but the bees of the same shade were in different propor in the various offspring.

The interpretation of the results obtained is rendered difficult thr not knowing the drone fathers. Nevertheless they indicated Mend inheritance. The appearance of an almost continuous series of i mediates shows that probably more than one factor is here at work

As a conclusion of practical value, it appears from the foregoing if the characters that are wanted depend upon the heterozygous na of the heterozygotes, the way to get them is to breed together the pure homozygotes. Thus from the union golden × black all inte diates are got, whereas from the union intermediate × interme only a proportion of intermediates are obtained.

The union between golden queen and black drone is practicall tainable on a large scale, and their offspring possesses certain qua that are very desirable. The workers show themselves vigorous, h and industrious; the intermediate is considerably larger than the go (in both queen and worker) and slightly larger than the black. colonies are very populous, the golden queens being more prolific tha black; their temper is usually good, though it becomes hotter in generations when the black colour predominates.

As it is not possible in the case of bees to control matings by m of isolation, the only way of obtaining desirable characters seems t fixing them by selection in the queens. A desirable character may ap not in the queen but in the worker (for instance, exceptional indus For such characters the colony must be considered as the unit. F

It is generally admitted that the drones are produced parth genetically and it is proved that a queen which has not been fertilized duces drones only. But are *all* the drones produced by a *fertilized* q the result of parthenogenesis? Perez in 1878 thought not, becau examining 200 drones produced by an Italian queen fertilized French black drone he found 149 which he thought indicated hybri

If it is true that drones are always produced parthenogeneti the queen, provided her gametes be pure, must produce pure drone matter what kind of drone has fertilized her. The writer has bred d from about half-a-dozen of his golden queens every season for some y Some of these golden queens were producing only golden workers, produced certain proport intermediates, others only int diates. The drones from s producing all golden workers all golden, as were also from most of the queens prod some or all interm t two of these queens produced tain proportions o

In trying to ex kable result one is apt to suspect the queen was not p golden gametes, but the facts the queen had the scute the abdomen almost to the tip y

at a queen thus colored had never been known to produce a black
, oppose this view. In conclusion the writer does not consider
his observation seriously endangers the theory that the drone is
produced parthenogenetically, but is of opinion that cases such
should receive the fullest investigation.
Italian bees, the workers all come perfectly true to a color pattern
ike that of the cross between English golden and black, while the
, on the contary, show immense variation. The question arises,
ese differences in the queen mere fluctuations or do they stand for
in the gametes which do not manifest themselves in the workers?
would be interesting to ascertain if Mendelian rules are followed
inheritance of the bands of short white hair, which, in the Italian
Carniola, is highly developed on each segment, except the first
e last, and which is but feebly developed in the English black bee.
alian bees enjoy justly a world-wide fame, but in England, owing
summer climate not being warm enough for them, the Italian-
h half-breds usually produce better results. One of the best
ies of Italians is their resistance to the disease known as European
Brood (1), and it would be well worth while to try to discover
er this quality is shared by the Italian-English half-breds. A
might perhaps be bred to resist that still greater scourge the Isle
ight Disease (2).

Notes on Bee-keeping in Australasia.

unwick, L. L. in *The Agricultural Journal of South Africa*, Vol. IV, No. 5, pp.
-747. Pretoria, November 1912.

his paper is the result of data and information collected during
rney in the Commonwealth.

The first thing that struck the writer was the huge "takes" of
in Australia, no less than 200 lbs. being considered as fair, and this
up to 500 colonies are kept. The chief nectar producing plants
he various gum and boxwood trees. Experience has shown that
ker Colour and Golden Italian bees have been found to be the best
d to the requirements of the bee keepers, and large numbers are reared
ally; as much as 15s. is paid for a select tested queen of this var-

In New South Wales the hive which has practically been adopted
standard is the Longworth. In Victoria an Act has been passed,
g into force on the 1st of January 1913, prohibiting the keeping
s in anything but moveable frame hives. A similar law was en-
in New Zealand six years ago. [illegible] Apiaries Act, 1907, requiring
bee-keeper to give notice to [illegible] (Gobernatary for Agriculture of any
e found to exist in his apiary [illegible] when paid by an inspector,
either orders that the disease-[illegible] apparatus destroyed or leaves in-

[illegible]

1) See No. 1202, *B.* Aug.-Sept.-Oct. 19[illegible] 2 [illegible] (*Ed.*).
2) Caused by *Nosema Apis*. See No. 1849, [illegible] Oct. 1912. (*Ed.*).

structions for their treatment. Within six months of the passing of Act no bee-keeper was allowed to keep his bees in other than frame and further, should the inspector discover a hive where the frames not readily be removed, he has the power to order that the bees be ferred to another hive within a specified time. By this means they in time to get rid of foul brood and other bee diseases.

Large extractors carrying six and eight frames are in general and larger ones driven by small engines are also made. A firm in South Wales has patented a machine to dispose of the cappings is really one tank inside the other, the space between being occupi water kept at the proper temperature by a paraffin stove placed u neath. The cappings, as they are cut from the frames, fall on grating and then to the bottom of the inner tank, where the wax and flows out by the adjustable outlets, the upper of which delivers pure wax, which is lighter than the honey and other impurities.

The honey is put up in tins ranging in size from 1 lb. up to 60 Tins of 56 lbs. are generally used for export. The wholesale price honey in Australia in 56 lb. tins is usually about 2 3/4 *d.* per lb., but at that figure apiarists are able to make a good living out of bee-keep

To provide an outlet for such large quantities of honey, the Gov ment instituted a Co-operative Union in which the farmers have sh The Union, besides honey, receives also other produce for export. farmer delivers his produce at the stores and at the same time rec the wholesale market price, less a small commission for working expe The Union controls the market, securing supplies when they are wan and preventing overstocking.

In Victoria, a strong association known as the "Victoria Apia Association" exists, the special function of which is the holding o annual conference. The executive have recently been successful in taining reduced railway charges for honey and bee appliances over Victorian Railways.

In Victoria a disease has been discovered, which appears to be lim to that State and which has been termed D. T. or "disappearing tri It is believed to be due to malnutrition of larvæ, bee paralysis, and *sema apis*. As the name suggests, the bees disappear rapidly, bu more dead bees are found round the hives than would be found an any healthy stock.

The other bee diseases known in Australasia are foul brood and p lysis, but these cannot be described as being very prevalent.

164 – **The Fungi of the B**

BETTS, ANNIE, D.: *The Journ* *mic Biology*, Vol. 7, No. 4. pp. 129-162. don, December 1, 191

A short accoun previous work that has been d from 1854 to 1912, o ent in bee-hives; and some quest arising from these r cussed. A general description of

ions prevailing in the hive, and of the distribution of fungous growth re given. The following twelve fungi are described and illustrated: obably confined to the hive: *Pericystis alvei*, *Oospora favorum* common species).
lapted to hive-life, but not confined to this habitat: *Gymno-setosus*; *Eremascus fertilis* (not common).
mmon, but not specially adapted to life in the hive: *Penicillium eum*, *Aspergillus glaucus*, *Citromyces subtilis*, *C. glaber*, *Mucor* (chiefly, if not exclusively, found on dead bees).
casionally present: *Aspergillus nidulans* (probably absent from y stocks); *Sordaria fimicola* and *Gymnoascus ruber* (coprophi-

e literature cited, including 30 papers, is appended.

Fish-Breeding in the Streams of the Domanial Forests of Hungary.

ONFFY, GYULA. A-m. kir. kincstári erdőségek halasvizei. — *Erdészeti Lapok*, r LI, Parts XIX, XX, XXI, XXII and XXIII, pp. 779-799, 834-853, 898-908, 934- and 970-976. Budapest, October 1 and 15, November 1 and 15, December 1, 1912

Hungary, most of the domanial forests are situated in the west rth of the country; there are also the principal groups of plain (Alföld). According to the ministerial report of 1910, the area the forest administration amounts to 3 214 853 acres. Under tural conditions obtaining in Hungary, which is very well supplied ater, the streams form a large network within these estates and ofits derived from the fish, etc., which are under the charge of the fiscal administration, form an important part of the revenues of tate.

cording to the data collected by the Ministry of Agriculture, the of the area belonging to the Treasury which can be employed for r purposes is 43 493 acres. The streams which are known and ied have a total length of more than 3000 miles. The area which ater is administered by 124 forestry officials. The right of fishing territory does not belong exclusively to the Treasury, but is shared y the owners of properties adjoining the streams. As the Treasury ses the right of fishing both on the plain and in the mountain streams, sh over which it has control include all the species which usually it fresh water in Hungary, notably the following species: perch *fluviatilis*), pike-perch (*Lucioperca sandra*), *Aspro communis*, (*Acerina cernua*), miller's-thumb (*Cottus gobio*), *Cobius marmor-*burbot (*Lota communis*), carp (*Cyprinus carpio*), Prussian carp ssus *vulgaris* and *C. gibelio*), tench (*Tinca vulgaris*), barbel (*Bar-viatilis*), Petény barbel, gudgeon (*Gobio fluviatilis*), bitterling (*Rho-amarus*), bream (*Abramis bram*), [illegible] (*Alburnus lucidus*), *Idus* roach (*Leuciscus rutilus*), minnow (*Phoxinus laevis*), loach (*Cobitis ida*), *Chondrostoma nasus*, sheatfish (*Silurus glanis*), grayling (*Thy-s vulgaris*), trout (*Salmo fario*), salmon (*Salmo salar*), shad (*Alosa vul-*

garis), eels (*Anguilla*), sturgeon (*Acipenser sturio*) and lampreys *myzon*).

The number of fish in the streams varies according to the pre conditions; as a rule there are few and in some streams none. The of the decrease is chiefly a too great extension of fishing rights. face of these regrettable circumstances, the forestry administration a commendable activity, devoting its whole care and efforts to the ject of fish-breeding. There are at present 37 establishments for the ficial incubation of trout eggs; these institutions work under the dire of the administration of the domain and are mostly furnished with fornian apparatus, the number of the latter being 279. In addi there are 6 breeding ponds for rearing trout fry, which remain throughout a summer. Thanks to these measures 1 470 000 eg river trout and rainbow trout have been hatched in the above-men apparatus in the course of the year, and from these, 972 000 youn were transferred to the ponds.

It should be noticed, that the administration of the Domain is g supported by the Royal Fishery Inspection, which has its seat in a B attached to the Ministry of Agriculture. This bureau has fixed th alities for the establishment of Stations for artificial incubation, a breeding ponds, and has distributed gratuitously the incubation appa and the trout eggs. The cost of these installations under the adm tration of the domanial forests is about £833, estimating the averag pense of building the stations and making the ponds at £16 10s. and that of the apparatus at 8s. 4*d*. each. The whole number o which have recently been hatched artificially represents a sum o reckoning 3s. 4*d*. per thousand eggs.

The streams of the Royal Domain are turned to account in dif ways. Most of them are let with the land, but some of them are not sometimes the fishing rights are let with the shooting.

Fish and fishing licences bring in annually the sum of £22 37 650 acres. Nevertheless, seeing that of all the domanial land w by streams, 5841 acres are at present not utilized, and that their zation would greatly increase the revenue, it would be interesting to the value they represent. In order to make this estimate, it is nec to classify the extent of these streams according to the principal where the different fish are found:

	Area in acres	Actual revenu
1. Bream district	33 021	2s. 1d
2. Trout district	5 345	1s. 11d
3. Barbel district	5 127	8

Thus if these s[illegible]re utilized and the average rent streams was obtain[illegible]taking the minimum sum, in this c revenue from the s[illegible]f the Domanial forests would be:

	£
Streams with bream	3483
Streams with trout	517
Streams with barbel	180
Total	£4180

The annual return from trout streams is very variable. According
e data collected by each of the Central Forestry Bureaus, it varies
een 3*d.* and 5*s.* 7*d.* per acre. Taking these figures as a basis, it is
that these trout streams might bring in an additional sum of from
to £1460. The following calculations show how the revenue from the
t streams could be increased.
It is well-known that, under normal conditions (presupposing some
ation being paid to the streams and their stock of fish) a stream of
acre can produce from 23 to 39 lbs. of trout. Taking 2*s.* per lb.
e minimum sale price of the fish, the net revenue from one acre of
r would average about £3; thus the revenue of the 5345 acres of trout
ms would be about £16 000; this sum could even be increased in
w years, if the Administration continued its present exertions in pro-
ng and extending systematic breeding of fish.

FARM ENGINEERING.

Trial of a Dodenhof-Meyer Manure Distributor.

IZEK, Jos. Prüfung eines Düngereinlegers System Dodenhof Meyer. — *Wiener Landwirtschaftliche Zeitung*, Year 62, No. 100, p.1151. Wien, December 14, 1912.

Two manure distributors on Dodenhof-Meyer's system were sent
tried. One was provided with an interchangeable plough-share,
the other lacked. Their weight was 12 lb. 2 oz. and 11 lb. respec-
y. They consist of a screw-shaped steel plate with a shaft by means
hich the apparatus is fastened to the beam of the plough instead
e coulter. Its action consists in rubbing the fertilizer into the fur-
made by the plough.
From the experiments made it appears that the apparatus increases
resistance to traction of the plough by 44 to 57 lbs.
The quality of the work performed was excellent in every trial.
manure was completely and uniformly ploughed in, and it seems
the apparatus will also be useful in dealing with green manures.

Tapping Rubber Trees by Electricity.

he India Rubber World, Vol. XLVII, No. 3, pp. 142-143 + figs. New York, Decem-
1912.

George M. von Hassel has devised an apparatus for tapping rubber
by electricity. Upon the trunk of each rubber tree is placed a piece
eet-iron about 5 ft. long, 5 in. wide, [illegible] two sides folded back
ust the tree to a thickness of about 2 [illegible], constituting a hollow

channel of sheet-iron. This hollow channel is divided into a series 15 to 30 sections; the number of sections depends upon the number days the apparatus is to be worked. Each section has a mechanism the extraction of the latex from the rubber tree and a receptable for giving the flow, which also contains an acid preparation for the coagu tion of the latex. When working *Hancornia* and *Castilloa* trees, pla provided with longitudinal canals, in which the latex coagulates sp taneously in threads, are used instead of the receptacles for gathe the latex, and the product thus obtained is known as "Sernamby,

The method of operating is as follows: The above described de is fastened against the rubber tree. If it is a small tree there will be of them; if it is a large one there may be as many as nine circling the and about a hand-span apart. This apparatus is connected by an sulated wire with similar apparatus on all the other trees to be tap and with a central station which is equipped with electric power. machine devised by the inventor makes it possible to send the elec current so that it will set each section in motion separately. W the first section is at work the latex oozes out and flows into the re tacle immediately beneath. The next day — or preferably 48 h later — the current is turned on to the second section, which in its t taps the tree and so on for all the sections. After 30 or 60 days not remains to be done but to collect all the rubber at one operation.

168 – **Spraying Machines in Malaysia.**

ALEXANDER, D. C., jr. in: *Daily Consular and Trade Reports*, 15th Year, No. 2 1143. Washington, December 3, 1912.

There is a large market for spraying machines in the Feder Malay States, and the writer believes that there is also a good dem for the same machines among the rubber growers in Java, Sumatra, Ceylon.

On practically every rubber estate in the Federated Malay St several spraying machines are in constant use, both for spraying the ru trees and for spraying and killing the lalang grass, or weed. This g which seems to spring up as soon as the jungle is cleared, sinks its so deeply as to interfere seriously with the root nourishment of the y rubber trees. Indeed most planters consider lalang their greatest en and large sums are spent annually in combating it.

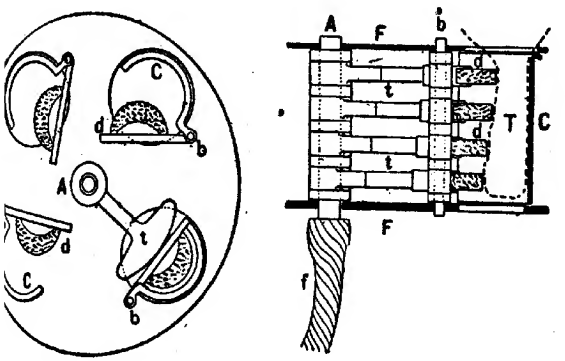
When the young trees are set out they are spaced about 20 ft. a and the lalang is dug out along the lines with "chukohs" (hoes). W once the trees are fairly started, spraying with a herbicide is usually stituted for the more expensive hoeing, though the usual chemical plied do not kill the roots and have therefore to be applied at fre intervals. The herbicide most generally used is arsenite of soda.

Two or more types of spray[illegible] machines are used on the rubb tates. The larger ones, fo[illegible]ork, are mounted upon small t drawn by horses or coo[illegible] spraying lalang, the most popular ma is a knapsack, as it c[illegible]sed by a coolie upon steep hillsides w a truck could not go

Milking Machine at the Central Competition at Amiens.

PAS, G. Une Machine à traire au Concours Central d'Amiens. — *Bulletin de la Société des Agriculteurs de France*, December 1, 1912, pp. 378-379. Paris, 1912.

the last Central Agricultural Competition held at Amiens, the irm "la Galakton" showed a milking-machine of which the prin- diagrammatically shown by our figure. The apparatus is almost shape of a flat cylindrical box, of which the top and bottom are by two plates F, each furnished with four large holes arranged same manner as the teats on the cow's udder. Between the plates erpendicular to them, are four hollow half-cylinders, C, of alumi- against the concave surfaces of which the teats are placed; to the milk, each element C is provided with a series of four or five ic fingers, *d*, each ending in a thick cushion of rubber; the fingers



on an axis *b*, parallel to C, from which it is held away by a spring. centre of the apparatus, there is an axis A, which is revolved by ible tube *f* connected with any part of a machine with a rotatory ment; this axis A bears four or five rods, *t*, which during the rota- sh successively each of the fingers of the milking elements C. As in the right-hand portion of the figure, these different fingers are erposed exactly one over the other, but are slightly out of line, the one at the highest level works first, and the others rapidly it one after another. Thus the teats in the half-cylinders C are mpressed near their insertion on the quarters, then progressively p to bottom, towards their extremities; this process extracts the ithout any need of mechanical suction. There are also fairly sim- justments for the adaption of the machine to differently shaped , ard a harness, rapidly adjusted to the animal, supports the ma- while at work.

170 – Testing the Wallace Milking Machine.

HANSEN. Prüfung der Wallace-Melkmaschine. — *Wissenschaftliche Rundschau*, 13-14, pp. 49-56. Supplement to *Georgine, Land- und Forstwirtschaftliche Zeitung*, 5, No. 100. Königsberg, December 14, 1912.

During six months, Dr. Hansen has been making experiments with the Wallace milking-machine at the Agricultural Institute of the Albertus University at Königsberg; the results obtained are incorporated in the following report.

The writer first gives a description of the apparatus and the method of working the machine. Then he proceeds to a description of the experiments and discusses the data obtained.

The experiment lasted from October 3, 1911 to April 4, 1912. Twenty different cows were experimented upon. None of the animals showed any objection to being milked by the machine. The first few days it was not possible to milk the cows dry, but already on the fifth day the strippings obtained by hand were only 4 oz. per cow, not even 2 per cent of the total amount. In the week of October 13-19, the strippings of 119 milkings amounted to from 0 to 8 oz. in 108 cases, and to more in 11 cases. It is very important that the udder of the cow should be milked at the close of machine-milking; by this means the cow can be milked dry by the apparatus.

The strippings, obtained by hand after using the machine, show a higher fat-content than that of the rest of the milk. The average proportion is 2:1; thus milking dry is of great importance. Of 210 milkings in the week of November 23 to 29 the strippings obtained by hand were in 162 cases from 0 to 3½ oz., in 23 cases from 4 to 5 oz., in 13 cases from 7 to 8 oz.; but in the four last cases 11, 14, 18 and 21 oz.

The milking machine has no bad effect upon the amount of milk or on the fat-content. If the strippings are not removed by hand the quantity appears at first slightly to decrease; the cow however recovers its full milking powers after a few days, when it has become accustomed to the new conditions.

It is an important fact, that in isolated cases the strippings are considerable and that usually the preceding and subsequent milkings are satisfactory. The cows depend somewhat upon the stripping by hand and they yield the milk regularly when this supplementary process is omitted. Machine-milking was practised exclusively from January 10 to April 10, 1912 and no diseases of the udder made their appearance; also in no case was a rapid fall in the milk yield noticeable.

One person can work three machines at once and is able to obtain from 400 to 450 lbs. of milk from 20 cows in an hour.

For the apparatus to work well, it must be kept scrupulously clean, which entails absolute cleanliness in the cow-shed; further, the animals themselves must be rightly handled.

According to the writer, hand-milking with really good operators is however the ideal method, for a good milker is able to treat each cow individually. But skilled and conscientious persons can milk a

ughly, even with a machine, and up to a certain point, not lose of the individual requirements of each animal.
The Wallace milking-machine is therefore much to be recommended iry work; its performance is equal to the work of the average milk- d far superior to that of an inferior operator.

RURAL ECONOMICS.

The Standing Working Capital in one Hundred Farms in Silesia.

IOLTE-BAEUMINGHAUS. Das stehende Betriebskapital in hundert landwirtschaft- en Betrieben Schlesiens. — *Veröffentlichungen der Landwirtschaftskammer für die vinz Schlesien*, Part 10, pp. 1-30. Breslau, 1912.

vailing himself of the abundant material at his disposal, the writer termined in this paper the amounts of living and dead stock which ber of Silesian farms show in their inventories and has drawn the sions that result from the averages of these figures.
e material was supplied by the book-keeping bureau of the Cham- Agriculture for the province of Silesia. The inventories of all the d farms here considered were drawn up by the writer himself.
the first part the principles adopted by the book-keeping bureau valuation of the agricultural inventory are set forth, so far as they to the so-called standing capital, which comprises the live and tock inventory.
the second and third parts the writer has shown by figures the in- that the intensity of farming, the size of the farm and the distance e railway have on the amount of living and dead stock in the ry; he has further determined the ratio of the numbers of draught nd of productive stock, as well as the figures of the total dead stock l to one unit of draught stock.
om the annexed table, in which all the averages found by the writer lected, the following results are obtained.
) The average number of head of all live stock expressed in head cattle amounts to 21.27 per 100 acres, worth £320 2s. 6*d.*
) The average number of draught stock amounts, per 100 acres, head, worth £88 7s. 6*d.*
) The average number of productive cattle, expressed in head cattle, amounts per 100 acres to 12.46 head, worth £189 17s. 6*d.*
) As the farming grows more intensive the average number and the whole live stock, and especially of draught animals, increases.
) The number and value of the whole live stock diminishes with ease of the size of the farm (the diminution in draught animals he least).
) With the increase of distance between the farm and the railway rage number of draught animals diminishes slightly.
) The average number of draught animals is 46.54 per cent. umber of productive stock, and 27.56 per cent. of the total live

Average standing working capital on 100 farms in Silesia.

Class of farm	Total live stock (in head of large cattle) per 100 acres. Number	Total live stock (units) on 100 acres. Value	Draught stock (units) on 100 acres. Number	Draught stock (units) on 100 acres. Value	Total dead stock on 100 acres. Value	Productive cattle on 100 acres. Number	Productive cattle on 100 acres. Value	Total dead stock corresponding to 1 unit of draught stock. Value
		£ s d		£ s d	£ s d		£ s d	£ s d
All the 100	21.27	16 0 1	4.24	4 8 4	7 3 7	12.46	9 9 11	— 13 10
Yield up to 200 marks per ha. (£ 4 per acre)	17.42	12 1 10	3.31	3 2 0	5 10 9	—	—	—
Yield between 200 and 500 marks per ha. (£4 and £10 per acre)	20.99	15 4 7	4.23	4 7 8	7 1 3	—	—	—
Yield above 500 marks per ha. (£10 per acre).	27.38	22 3 3	5.46	6 4 11	8 16 2	—	—	—
Size I, up to 250 acres	29.80	22 3 7	5.78	5 7 6	12 9 3	—	—	—
Size II, 250 to 625 acres	23.77	18 1 1	4 40	4 17 4	7 15 3	—	—	—
Size III, 625 to 1000 acres	19.20	14 12 8	4.08	4 3 11	6 10 11	—	—	—
Size IV, 1000 to 1500 acres	17.52	22 19 2	3.78	3 15 4	6 1 4	—	—	—
Size V, above 1500 acres	16.16	10 9 11	3.76	3 3 3	3 8 4	—	—	—
Distance from railway up to 3 km. (1.8 miles)	—	—	4.28	4 15 8	—	—	—	—
Distance from railway 3-6 km. (1.8-3.6 miles)	—	—	4.38	4 9 2	—	—	—	—
Distance from railway over 6 km. (3.6 miles)	—	—	3.07	3 16 6	—	—	—	—

k in the inventory, while the whole productive stock is 59.32 per

8) The value of total dead stock per acre of cultivated area is s. 9*d.*

9) The average value of the dead stock diminishes with the extent he cultivated area.

10) The average amount of dead stock increases as the farming mes more intensive.

11) The amount of dead stock corresponding to each unit of ght. stock is £34 5*s.*

12) The average value of the whole of the dead stock is 44.88 ent. of that of the whole of the live stock in the inventory.

Wages of Farm Labour in the United States.

OLMES, GEORGE, K.: *Nineteenth Investigation, in* 1909, *continuing a Series that began in* 866. — *U. S. Department of Agriculture, Bureau of Statistics - Bulletin* 99. Washington, ovember 1912.

The present report contains the results of 19 different investigations the conditions of agricultural wages in the United States and reaches to 1866, in which year, for the first time, the average rates of wages e United States were scientifically determined. The writer gives a summary of the information he was able to obtain concerning the tion of agricultural wages previous to 1866. Most of this informa- was found in the works of the statistical bureaus of the various States, l crop reports, and in the old year books of some farms.

They rarely afford average rates of wages, but only the wages of cer- kinds of agricultural labour. From the above summary it appears agricultural wages in the second half of the eighteenth and in the half of the nineteenth century were relatively high in the United s, and further that economic disturbances, such as those caused war, exert a great influence on the rates of wages.

After some explanations on the method followed in calculating the ge rates of wages, the writer gives tables of the average wages from to 1909 and for the several States, for the geographical divisions of Inited States, and lastly for the whole of the Federal territory.

The monthly wages for male labourers which are engaged by the year, out board, were lowest in the South Atlantic States and highest e western States; the average figure for the United States was o ($3 3*s.* 9*d.*) in 1866; it rose then to $17.10 (£3 10*s.* 4*d.*) in 1875, to $16.79 (£3 9*s.* 1*d.*) in 1878 and rose continually till 1909 when it ed $25.46 (£5 4*s.* 9*d.*) When board was supplied the western of States still returns the highest figures, namely $31.30 (£6 8*s.* 9*d.*), follow the northern central States with $22.22 (£4 11*s.* 5*d.*), the Atlantic States with $20.73 (£4 5*s.* 3*d.*), the southern central States $14.25 (£2 18*s.* 8*d.*) and the south Atlantic States with the lowest of wages: $13.10 (£2 13*s.* 11*d.*).

When the labourers were hired only for the season the average wa with board, for the United States were in 1866 $12.69 (£2 12s. 3d.), in 1 $12.65 (£2 12s. 0½d.), in 1875 $13.53 (£2 15s. 8d.), and in 1909 $2 (£4 5s. 7d.). In this year the corresponding wage in the western St was $35.32 (£7 5s. 4d.), in the northern central States $25.42 (£5 4s. 7 in the northern Atlantic States $24.56 (£5 1s 0½d.), in the south central States $16.57 (£3 8s. 2d.), and in the southern Atlantic St $15.13 (£3 2s. 3d.).

When for the calculation of the average monthly wages, the wa of the labourers engaged by the year together with those hired only th season are used, the following are found : For 1891 in the whole of United States $13.48 (£2 15s. 6d.). During the industrial crisis of nineties wages fell, but rose again to $13.90 (£2 17s. 2d.) in 1899, $15.51 (£3 3s. 10d.) in 1902, $18.75 (£3 17s. 2d.) in 1906 and $2 (£4 2s. 4d.) in 1909.

According to the reports of the Inland Revenue the total amou of agricultural labourers' wages rose from $357 391 930 (£73 513 7 in 1899 to nearly twice as much, namely $651 611 287 (£136 769 9 in 1909. If it be considered that the average rate of wages has ris only by about 30 per cent. and that the number of labourers has certain not doubled within the 10 years, the great increase in the total can on be explained by assuming that the time during which agricultural labou ers are engaged in the course of the year has of late years considerab increased. The average amount of wages paid per farm was $62 (£ 0s. 3d.) in 1899 and $102 (£21 8s. 2d.) in 1909.

The average daily wage for harvest work, board being given at t same time, amounted in 1866 to $1.04 (4s. 5d.) and rose in 1875 to $1.1 (4s. 10d.) . It then fell and rose reaching $1.20 (4s. 11d.) only in 1 after which it sank to $0.96 (3s. 11½d.) in 1895 and rose again to $ (5s. 1d.) in 1902 and $1.43 (5s. 11d.) in 1909. The highest daily wa were $2.02 (8s. 4d.) in the western States in 1909, the lowest $ (4s. 3d.) in the south Atlantic States. The average daily wages for ot than harvest work in the United States were $0.64 (2s. 8d.) in 1 $0.68 (2s. 10d.) in 1875, $0.70 (2s. 11d.) in 1881; they remained ab stationary till 1898 and then rose in 1899 to $0.75 (3s. 1d.), in 1 to $0.83 (3s. 5d.) and to $1.03 (4s. 3d.) in 1909.

For the whole Federal States the average monthly wages rose fr 1866 to 1909 by 78.9 per cent. for hands engaged by the year, and 63.9 per cent. for those hired only for the season. The daily wages harvest work rose from 1866 to 1909 by 37.5 per cent. and for other wo by 60.9 per cent.

The oscillations in the rates of wages are illustrated by a diagra which shows at a glance that the industrial crises of the seventies and the nineties depressed agricultural wages, which rose considerably fro 1890 to 1908.

The writer remarks further that the wages in money do not represe the whole earnings of the agricultural labourers, who often get suppl

in the shape of supplies in kind or of the use of dwellings, stables, ds, pastures, etc. These supplements are valued very differently ding to circumstances, in the several States and even in various of the same State. The monthly value of a dwelling house and is estimated at $1.75 to $5 (7s. 2½d. to £1 0s. 7d.) when the la- gets board also, and $1 to 4.50 (4s. 1½d. to 18s. 6d.) when he ot.

he average value of the forage for a cow, a horse, a pig, or for poul- set down at $1.11 to 3.11 (4s. 7d. to 12s. 9½d.) per month. The e monthly value of pasturage for a cow, a horse or a pig amounts 5 to 1.61 (2s. 8d. to 6s. 8d.). Wood for fuel and the use of the team h it is considered equivalent to $1.06 to 2.39 (4s. 4d. to 9s. 10d.) nonth.

etween 1890 and 1907 the wages of agricultural labourers rose much han those of hands engaged in the industries. The average figures latter between 1899 and 1907 are 11.20 per cent. higher than those n 1890 and 1898, while among agricultural labourers the corre- ng increase is 21 to 26.6 per cent.

e value of the labourer's board was estimated at $5.41 (£1 2s. 3d.) nth in 1866, at $6.20 (£1 5s. 6d.) in 1880, and at $7.41 (£1 10s. 6d.)). In the case of daily wages at harvest time the value of the as considered to be $0.30 (1s. 3d.) in 1866; during the industrial f 1894 it fell to $0.21 (10½d.) and rose to $0.28 (1s. 2d.) in 1909. the rest of the year it is valued $0.02 to 0.03 (1d. to 1½d.) less r.

1866, the daily wages for harvest work were, on average, paid 1s. 10d.) more than for other farm work; in 1880 this difference ed to $0.57 (2s. 4d.), in 1894 to $0.34 (1s. 5d.) and in 1909 to $0.42).

en the labourer was hired only for the season the monthly wages 1866 $2.58 (10s. 7½d.) and in 1909 $2.79 (11s. 6d.) higher than e was hired for the whole year.

the second and smaller part of the report, the writer gives a of the results of three enquiries (1902-1906-1909) on the conditions s for female domestic labour in the country.

1909 26.4 per cent. of the female servants were hired for the whole he highest percentage is 40.6 in the north Atlantic States, then he south Atlantic States with 30.8, the northern central States .1, the southern central States with 22.7 and lastly the western with 22.3 per cent.

average monthly wages of these servants amounted in 1902 (£1 15s. 9d.), in 1906 to $10.80 (£2 4s. 5d.) and to $10.39 (£2 2s. 9d.) In 1909 they were highest in the western States $18.74 (£3 17s.); lowed the north Atlantic groups of States with $11.59 (£2 7s. 8d.), hern central States with $11.38 (£2 6s. 10d.), the southern middle with $8.22 (£1 13s. 10d.) and lastly the south Atlantic States 39 (£1 6s. 3½d.).

When the servants were hired only for the season the monthly w were, on average, $1 to $1.50 (4s. 1½d. to 6s. 2d.) higher; in the wes States in this case they reached in 1909 $21.55 (£4 8s. 8d.), in the n Atlantic States $8.25 (£1 13s. 11d.).

As daily wages for female farm hands $0.62, 0.76 and 0.77 (2s. 6 3s. 1½d. and 3s. 2d.) were paid in the above three years.

The returns showed that the neighbourhood of towns with upw of 25 000 inhabitants did not have in every State the effect of increa the rates of wages of female workers, and that this depends more on special conditions of each State.

In conclusion the writer notes that also in the United States w in the household is often considered as a derogatory occupation, and deplores the disappearance of the so-called home industries in the co try.

173 - **The First Year of Book-keeping at the Agricultural Institu Rotholz in Tyrol.**

GROFF, L.: Das erste Buchführungsjahr an der landwirtschaftlichen Landesanstal holz in Tirol. — *Wiener Landwirtschaftliche Zeitung*, 63rd Year, No. 3, pp. 25-26 January 8, 1913.

The writer proposes to show by the present results of book-ke how erroneous is the widely spread view that the farm of an educa institution cannot in itself be a profitable undertaking.

The farm of the Institute is of a compact form and includes 242 of arable land, 168 acres wooded area, and 617 acres of alpine pas Of the arable land 178 acres are rented out, only 64 being farmed b Institute. Of these 44½ are under lea and forage crops, 12 acres de to other crops and 7½ to the nursery and vegetable garden.

The accounts are divided into three groups: 1) field crop acco 2) live stock and alpine pasture accounts, 3) technical or acce industrial branch.

The total expense for the meadows amounted in 1911 to £179 2s the gross returns to £361 16s. 11d., which leaves a net profit of £18 3d., or 16.5 per cent. on the capital. The fairly high yield of 63.7 of hay per acre from the bad wet meadows of the Institute is due t dry summer.

The favourable weather allowed the hay to be harvested with a amount of labour, so that the cost of production, 1s. 6d. per cwt., is l below the calculated market price of 2s. 7½d. per cwt. For clover the cost of production, owing to the greater amount of work it en is much higher: 2s. 1d. per cwt.

The further calculation of the profits on the field crops is given i following table.

The cultivation of green maize yielded only 5 per cent. int while with vetches the cost of production was much higher than the of the vetch hay. The field crop accounts show on the whole a net fit of 14.2 per cent. on the capital.

Crops and Area in acres	Expense £ s d	Gross returns £ s d	Net profit Total £ s d	Per acre £ s d	Per cent. on capital
ss . . . . . 4.32 acre	99 10 9	138 8 4¾	38 17 7¾	8 19 9	21.0
. . . . . 4.64 »	59 8 1½	76 5 4	16 17 2½	3 12 6	8.7
lds . . . . . 0.79 »	26 19 6¼	35 19 4¼	8 19 10	10 16 10	26.4

The alpine pasture yielded £84 16*s.* 10*d.* against an outlay of £66 16*s.* *d.*, the net profit being thus £18 os. 6¼*d.*, or 0.91 per cent. of the ca-

In order to improve this result the writer demands that the sum for the grazing of stock belonging to outsiders be raised. At present only 1.3*d.* per head per day.

In the cattle shed there were in 1911, 45 cows, 1 bull, and 5 heifer and l calves. The net profits from the cattle amounted to £88 2*s.* 7¼*d*, 4 per cent. on the capital. (Outlay £954 3*s.* 2¼*d.*, gross returns 5*s.* 9½*d*). Pig rearing yielded as much as 9.05 per cent. on the al. The total outlay for draught stock (2 horses, 2 oxen, 1 mule) sents, after deduction of the income derived from manure, increase lue and work done for hire, the value of the work done in the farm. account therefore shows no net profit.

The dairy gave a net profit of £105 4*s.* 10*d.* or 22 per cent. on the l. The production of butter and skimmed milk cheese proved profitable than the direct sale of the milk. The percentage of net seems disproportionally high; the reason of this is to be sought low valuation of the capital. The total net return of the farm ged by the Institute is 7.24 per cent., and including the accessory tries (dairy, forest and nursery) 7.8 per cent. of the capital.

To these very favourable results in 1911 several factors contributed: ice given to the land: £19 16*s.* 9*d.* per acre, is very low in comparison sent prices. The weather conditions of 1911 were unusually fa- ble for the property, which has an excessively moist subsoil; and ver possible expensive human labour was replaced by labour-saving nes. But even giving the land a higher value and allowing for less rable weather, the interest on the capital engaged in the farm of stitute will not sink below the normal rate of 4 per cent.

A Cantonal Agricultural Book-keeping Office.

e kantonale landwirtschaftliche Buchführungsstelle. Mitteilung der landwirtschaft- en Gesellschaft des Kantons St. Gallen. — *Schweizerische Landwirtschaftliche Zeit- rift*, Year XL, Part 50, pp. 1164-1165. Zürich, December 13, 1912.

The board of the agricultural society of the Canton of St. Gall re- l on December 2, to institute a cantonal book-keeping office in con-

nection with the agricultural School at Custerhof. The chief ob of this office is to awaken the interest of farmers in agricultural acco and to induce them to practise regular book-keeping. The m employed to attain this end are : courses of instruction and the publi tion of the results of farming.

AGRICULTURAL INDUSTRIES.

175 – Dairying in Hungary in 1911.

KOERFER, STEPHAN.: Ungarns Milchwirtschaft im Jahre 1911. — *Ausgaben des Kö ung. Ackerbauministers.* Budapest, 1912.

For the clear representation of the dairying conditions of Hung an examination of the available date on the numbers of head of ca and sheep existing in the country is necessary. The following tab I and II, supply the required figures :

TABLE I. — *Number of Cattle in Hungary.*

Breed of Cattle	In 1895 Head	In 1911 Head	Variation Head	Variation Per cent.
Hungarian	3 756 137	1 872 790	— 1 883 347	— 51.4
Parti-coloured	347 527	3 590 818	+ 2 243 291	+ 166
Gray	158 112	171 867	+ 13 755	+ 8
Other breeds	434 664	392 757	— 41 907	— 9
Buffaloes	132 578	155 192	+ 22 614	+ 17.
Total	5 829 018	6 183 424	—	—

TABLE II. — *Number of Sheep in Hungary.*

Breed of sheep	In 1895 Head	In 1911 Head
Merino	7 526 686	2 353 105
Raczka and Czigaja		4 037 345
English mutton sheep		1 306 431
Total	7 526 686	7 696 881

In the census of 1911 the different breeds of cows were returned ately. Altogether there were 2 619 264 head, or 42.35 per cent. e total number of cattle.

The writer lays down for the cows of each breed a certain average ly production of milk, and with this basis and the number of cows alculates the total amounts of milk produced in the country. For garian cows the average yearly yield is 198 gals. For parti-coloured 330 gals., gray cows 396 gals., other breeds 264 gals., and buffalo 176 gals.

According to the above the production of cow's milk was, in 1911, million gallons, worth about £18 700 000 (calculationg 5.9 *d.* per gal-

In the year 1911, 3 310 000 (in round numbers) ewes were milked; amount to 43 per cent. of the total number of sheep. Taking the y average at 8.8 gallons of milk per ewe, the total production of ewes' may be set down at about 29 million gallons, which, at 6.8*d.* per are worth about £820 000.

The value of the total milk production is thus about £19 520 000. e writer then calculates the cost of production of the milk and comes e conclusion that the keeping of milch stock is not often profitable e small farmer. He recommends the institution of milk record iations as a means of raising the production of milk, as the cost oduction diminishes (within certain limits) with the greater amount ld per cow. He reports next upon the Hungarian milk record asso- ns and on milking competitions.

f from the total amount of cows' milk produced, namely 760 mil- gallons, the quantity consumed by the population be deducted, cal- ng 26.4 gals. per head (of the 18 300 000 inhabitants) per year, or 483 million gallons, and the 15 million gallons of fresh milk which ported, there remain about 262 millions of gallons of cows' milk and illion gals. of ewes' milk for dairy purposes.

t is further stated that there are in Hungary about 600 dairy asso- ns; a certain number of them are cooperative, but very small. There esides two large joint stock companies which make and export r.

he production of cheese in Hungary is considerable. The chief ies made are Hungarian Emmental, Trappist, Romadour and rovar cheeses, besides the Liptauer made from ewes' milk.

table at the end of his paper the writer gives precise data on the produce exports and imports for the years 1909, 1910 and 1911, ling to which the amount of butter exported in 1911 was 60 038 nd that imported 14 292 cwt. As for cheeses only ewes' milk shows an excess of exportation (50 255 cwt.) over the importation cwt.). The imports of dessert cheeses are very much above the ts, while of other cheeses the amounts are nearly even.

176 – The Use of the « Gär-Reductase » Test in Conjunction with Usual Milk Tests as a Basis for the Price of Milk in Cooperative Dairies.

KONRADI, EMIL.: Die Gärreduktaseprobe in Verbindung mit der gewöhnlichen Milchprüfung als Grundlage für die Gütebezahlung der Milch in Genossenschaftsmolkereien. — *Molkerei-Zeitung; Berlin*, Nos. 52 and 53, pp. 601-602 and 613-614. Berlin, December 21 and 28, 1912.

The "Gär-reductase" test, according to Orla Jensen, serves to show defects in milk. The Gär tests alone were first used in Switzerland for testing and pricing the milk in cheese factories. The reductase test, which was first employed by Barthel, depends upon the fact that living bacteria have the property of taking up certain colouring matters and secreting in their place colourless matabolism products, whereby the colouring matters introduced into the milk disappear. The rapidity of this process depends on the temperature and the number of bacteria present. If all the samples of milk receive the same amount of colouring matter and are kept at the same temperature, the rate of discoloration depends entirely on the number of the bacteria.

Jensen has combined the two methods. He took a sample of 40 cc. from each milk can; to this he added 1 cc. of a methyl-blue solution made by dissolving one methyl-blue tablet, prepared expressly for this purpose, in 200 cc. of water. The milk samples into which the colouring matter had been introduced were placed in a water-bath, which was kept at the constant temperature of 38° C. The milk should be carefully watched for the first 20 minutes; afterwards it need only be looked at every quarter of an hour.

The milk can be divided into four classes, according to its behaviour during the test.

I. Good milk: the colour is perceptible for 5½ hours or longer. In this case, there are usually half a million bacteria to the cubic centimetre of milk.

II. Average milk: the colour is visible for at least 2 hours before 5½ hours have elapsed, the discoloration takes place. Number of bacteria per cc. usually from ½ to 4 millions.

III. Bad milk: the colour is apparent for over 20 minutes; before two hours, the colour disappears. Number of bacteria per cc. generally from 4 to 20 millions.

IV. Very bad milk: The colour is perceptible at most for 20 minutes. Bacteria per cc. usually over 20 millions.

As the bacterial flora in the milk samples is apparently unaffected by the colouring-matter absorbed, the various samples are kept at from 38°-40°C. until the next day (20-24 hours); at the end of this time the milk has usually curdled. The appearance of the curdled samples depends upon the bacteria which have gained the upper hand and which were present in the greatest number at the beginning of the experiment. The curd of the samples may be gelatinous, distended by gas, spongy or cheese-like,

this way demonstrate the presence of harmful bacteria in the
).
the results of the " Gär-reductase " test (taking also into consid-
the fat content, etc.) is taken as a basis for the price of milk, the
n arises whether the normal price should be paid for good milk
corresponding reduction made in the case of milk of inferior qual-
r whether there should be a fixed price for all milk, with an addi-
charge at the end of the year for especially good milk. The writer
the latter system the best. It offers more encouragement than
ice reduction for the production of milk free from defects.
riodic control of the milk sent to the dairies is therefore to be re-
nded. The writer mentions some Danish dairies in which such
rol is effected (now partly with the assistance of the " Gär-reduc-
test) twelve and twenty-six times respectively every year.

Prices of Meat in the Argentine, New York and some European ities.

- MICHELET, JUAN A. Precios de las carnes en la Argentina, y en las principales ciu-es europeas. — *Revista de la Asociación rural del Uruguay*, Year XLI, Nos. 9 and 10, 649-656 and 763-766. Montevideo, September and October 1912.
- Rapport de M. VINCEY à la Section de l'économie du bétail et de l'industrie laitière la Société des Agriculteurs de France. — *Bulletin de la Société des Agriculteurs de ce*, Year 15, pp. 13-16. Paris, Jan. 1, 1913 (2).

the *Argentine* the price of meat, which was 2.1 *d* per lb. at the begin-
1912 reached 3.4 *d* per lb. at the close of the same year. As a compa-
the writer gives the prices of meat in other countries, mostly ob-
from official publications. A typical case is provided by Great Bri-
hich consumes the best quality Argentine cattle at a lower price than
-exportable offals fetch in the producing country.
e Argentine municipalities oblige butchers to sell meat by weight
exhibit a list of prices ; but as a matter of fact the meat is sold by
t and not by weight, and the consumer pays 30 to 40 per cent. more
e nominal price. The following is the municipal tariff at Buenos
(in pence per lb.) :

rloin	7.7	Chop	2.9
uck-steak	3.8	Brisket	2.4
ound	3.8	Shoulder	2.4
	Bones	1.4	

ice of meat in New York. — In 1912 the prices of meat were the high-
r known in the United States. In September beef was at 30.3*d*
nd, and it was predicted that before the end of the year it would
1.7*d*. Cattle are sold at 15 to 17 *d* per lb. of live-weight. Reckoning
s at 59 per cent., the New York prices are lower than the Argentine
n Argentine the cold-storage firms pay 11 *d* to 12½ *d* per lb. live-

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he curd should be equally dense, and not stringy, flocculent or interrupted by gas
See RIEVEL, *Handbuch der Milchkunde*, p. 317. Hannover, 1910. (*Ed.*).
e also: VINCEY et ROLLIN, *Le prix de la viande à Paris* .Paris, Dunot-Pinat, 1912. (*Ed.*).

Price of meat in the United Kingdom. — In 1911 the Argentine f
shed 85.5 per cent. of the refrigerated meat imported. The amounts
to London were too large, so that prices fell and sales were made wi
per cent. loss. This state of affairs decided the Argentine cold-storage
to establish, at the beginning of 1912, an agreement by which the exp
tion of chilled beef was limited to 37 000 quarters per week, distrib
equally among the various exporting firms, instead of the 50 000 to 6
which were sent in the last few months of 1911. After the conclusi
this agreement, which the writer thinks essential to allow a margin of
fit to the Argentine companies, the prices of refrigerated and frozen
on the London market rose about the middle of 1912.

Live bullocks from U. S. A.,	per head (March 1912)	£ 18 to £ 25
,, ,, ,, Canada,	,, ,, ,, ,, ...	£ 17 to £ 23
Frozen beef from U. S. A.	. . . . . ,, ,, ...	5 ½d. to 6 ½d. per l
Argentine beef (May 1912):		
Hind quarter (chilled)	. . . . .	3s. 4d. to 4s. 4d. per stone
Hind quarter (frozen)	. . . . .	2s. 9s. to 3s. 6d. ,, ,,
Fore quarter (chilled)	. . . . .	2s. 4d. to 2s. 8d. ,, ,,
Fore quarter (frozen)	. . . . .	2s. 4d. ,, ,,
Frozen Argentine mutton (May 1912)	. . . . .	2s. 2d. to 2s. 7d. ,, ,,
Preserved meat (March 1912):		
Corned beef, 1st quality	. . . . . per case(*) . . .	33s. to 33s. 6d
,, ,, 2nd quality	. . . . . ,, ,, ...	27s. to 33s.
Boiled beef, 1st quality	. . . . . ,, ,, ...	21s. 6d. to 22s.
,, ,, 2nd quality	. . . . . ,, ,, ...	19s. 6d. to 20s.
Corned mutton	. . . . . ,, ,, ...	33s. to 34s.
Boiled mutton, 1st quality	. . . . . ,, ,, ...	28s. to 28s. 6d.
,, ,, 2nd quality	. . . . . ,, ,, ...	26s. to 27s.

(*) Containing 12 tins of 6 lbs. each.

Price of meat in France (1). — The following tables show the p
at some of the important markets in France:

Prices of meat on the market of La Villette, Paris (2)

Average price in	Bullocks		Cows		Bulls		Calves		Sheep		H
	Quality		Quality		Quality		Quality		Quality		Qu
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1s
	pence per lb.	pence per lb.	pence per lb.	pence per lb.	pence per lb.	pence per lb.	pence per lb.	pence per lb.	pence per lb.	pence per lb.	pe pe
June 1912 . . .	7.8	6.5	7.8	6.5	6.9	6.5	8.8	7.2	10.0	9.1	9
Year 1911 . . .	8.5	7.7	8.5	7.7	7.3	6.9	10.4	9.1	11.3	10.5	9
» 1910 . . .	7.6	7.3	7.6	6.9	6.3	6.1	8.6	7.7	9.5	8.7	7
» 1909 . . .	7.1	6.8	7.1	6.7	6.0	5.9	8.9	8.3	10.1	9.7	6
» 1908 . . .	7.0	6.4	6.8	6.1	5.7	5.4	8.8	8.2	10.0	9.4	7

(1) See No. 180 below. (E

(2) The wholesale prices of meat at the "Halles Centrales" and those of live s
the market at La Villette are published monthly in: *Ministère de l'Agriculture, Ins*
l'Agriculture, Bulletin mensuel de l'Office de Renseignements agricoles, Paris. (E

Mean retail prices in Paris, 1912.

Bullocks and Cows	Sheep	Calves
teak 1s. to 1s. 3d. per lb.	Breast 6d. to 7d. per lb.	Breast 10½d. to 1s. per lb.
. . 9d. to 1s. 1½d. ,,	Shoulder 9d. to 10½d. ,, ,,	Loin 11¼d. to 1s. 0¾d.
. . 1s. 1½d. to 1s. 6d.	Leg 11¼d. to 1s. 0½d.	
. . 1s. 4d. ,, ,,		
. 10½d. ,, ,,		

Prices of live stock at Bayonne.

Butcher's bullocks	3½d. per lb. live-weight.
Draught oxen	£24 to £32 the pair.
Cows	£18 to £26 ,, ,,
Milk fed calves	5½d. per lb. live-weight.
Sheep	4½d. ,, ,, ,,
Pigs	6½d. ,, ,, ,,

During the last ten years, the French exports of horses, cattle and ind fresh meat have been steadily gaining on the corresponding imports. nly exceptions were the years 1907 and 1901, during which the imports e pigs and fresh meat were again larger. On the other hand, for salt moked meat the imports have always exceeded the exports. Since the f last century the prices of meat in France have been going steadily At the end of spring in 1911 they were 25 per cent. above the means e years 1901 to 1910. These very high prices of the first half of resulted in an annual diminution of the consumption of meat in Paris to one-twentieth of the total consumption in 1910.

e retail butchers and pork-butchers generally sell at about 1 ½ *d* /4 *d* per lb. dearer than they buy, wholesale or semi-wholesale, at the cipal shambles at the "Halles Centrales" and in the provision markets. raising of price from the wholesale or semi-wholesale means about for general expenses and ¼ *d* or ½ *d* for profit. Thus in the price paid e Parisian consumer, the wholesale price accounts for 85 per cent. he retailer's handling for 15 per cent., namely 12 per cent. general ses and 3 per cent. profit. On the money returns of all sales, both and bye-products of the total of butchers and pork-butchers' beasts, untry provider gets approximately 76 per cent. For expenses and pro- e remaining 24 per cent. are thus distributed among the intermediaries: cent. to the railway companies, 1 per cent. to the auctioneers, 5 per to the city of Paris, 3 per cent. to the wholesale butchers and pork ers, and 13 per cent. to the retailers; this is reckoning all sorts and ies, and an average distance from Paris.

Price of meat in Sweden.

Bullocks and cows	3d. to 4¾d. per lb.
Sheep for slaughter	4½d. to 5¼d. ,, ,,
Suet	3¼d. ,, ,,

Price of meat in Belgium.

Year	1880	1890	1895	1900	1905	1910
Bullocks and cows pence per lb.	6.9	6.7	6.75	6.7	7.25	7.8
Pigs . . . ,, ,, ,, ...	7.8	6.25	4.4	4.8	6.1	7.1

Average prices in the first half of 1912.:

	Live cattle	Meat wholesal
	pence per lb.	pence per lb.
Native bullocks	4.3 - 5.4	7.4 - 9.75
Bullocks from U. S. A.	3.9 - 4.8	6.5 - 8.2
Dutch bullocks	4.8 - 5.4	7.6 - 9.5
French bullocks	4.8 - 5.2	7.4 - 9.5
Calves	4.8 - 6.3	8.7 - 13.0
Pigs	4.8 - 6.1	7.4 - 9.5

The eating of horse-meat has developed greatly in Belgium: in slaughter-houses at Brussels and Cureghem-Anderlecht the number of ho slaughtered has increased from 1847 to 3809 in the last five years. In 1 16 099 horses for slaughtering were imported into Belgium, valued by customs at £3 11s per head. At present the horses for slaughter (mo from Great Britain) fetch £6 to £12 for a weight of 660 to 880 lbs. consumer pays 3 ½d to 5d per lb. for horse-meat as steaks, 3d to for scrap.

Price of meat in Spain—The exportation of live beasts from the Argent to Malaga and Barcelona has given good results. At Barcelona the bulls sold at 6½d to 6 ¾ d per lb. of meat (weight of the quarters) and the sh at 6½d. Small beasts are preferred; bullocks should not exceed 550 (weight of the quarters) or sheep 42 lbs. The bullocks consumed in Spain mostly of good quality, especially the rather small native ones weighing to 400 lbs. The larger imported bullocks, weighing 600 to 800 lbs., are ha and less choice. Slaughtering calves under 130 lbs. in weight is prohibit

Sale prices of meat in Spain.

	Bullocks	Calves	Sheep	Grass Lambs	Milk Lambs	Sheep	Pi
Pence per lb. . .	6.4-7.5	8.75	6.9-7.6	6.5	8.75(*)	6.5	5.6-7

(*) Milk lambs are generally sold by head.

Retail prices of meat.

	per lb.		per lb.
Bullocks:		Milk kids and lambs:	
1st quality: under cut	1s. 6d.	1st quality	10½d.
1st quality without bones	11½d.	2nd quality with bones . .	8½d.
,, ,, with bones	7½d.	Sheep:	
2nd quality without bones . . .	9½d.	1st quality	10½d.
,, ,, with bones	7¼d.		
Calves:		Pigs:	
1st quality without bones . . .	1s. 6d.	Loin without bones	10½d. to 1s. 1
2nd ,, without bones . . .	11¼d.	,, with bones	8½d. to 9½d.
3rd ,, with bones	10 ½d.		

Prices of green hides.

	Pence per lb.
Bullock hide	6.3
Calfskin	7.4
Sheepskin	2.7
Lambskin	7.6

Price of Argentine meat in Austria.

	Pence per lb.
Price of frozen meat in the Argentine	2.3
Shipping from Buenos-Ayres to London	0.36
Shipping from London to Trieste	0.23
Austrian customs duty	1.4
Carriage from Trieste to Vienna	0.14
Expenses of unloading, etc.	0.05
Cost of 1 lb. of frozen meat delivered in Vienna	4.5

Argentine meat, at the depot, with 10 per cent. waste:
Fore quarters, per cwt. . . . . 30s.
Hind quarters, ,, ,, ... 35s.

Price of meat in Italy.

Retail prices.

	Fore quarter with bones	Hind quarter with bones	Meat without bones
	pence per lb.	pence per lb.	pence per lb.
Bullocks or Cows:			
ome	7.8-8.2	8.7-9.8	11.3-15.6
enoa	7.8	7.8	12.1-13.0
ologna	7.8	10.0	13.0
lorence	6.5-7.2	9.8	11.7-16.0
enice	8.2	10.0	12.1
Calves:			
ome	7.8-12.6	15.2-16.2	13.4-15.2
enoa	10.8	10.8	17.3-21.7
ologna	10.8	10.8	21.7
lorence	6.5-8.5	12.6-13.4	15.6

Cost of Argentine meat at Genoa.

	Pence per lb.	For shipments of over 1000 tons.
		pence per lb.
Meat on board at Buenos Ayres	2.39	2.17
Shipping to Genoa	0.87	0.35
Insurance	0.02	0.02
Customs duty at Genoa	0.61	0.61
Expenses of unloading, etc.	0.35	0.70
Total	4.24	3.85

Cost of Argentine meat at Rome.

	Pence per lb.
Cost at Genoa	4.24
Railway carriage from Genoa to Rome	0.26
Municipal dues	0.82
Slaughterhouse dues	0.07
Carting in Rome	0.04
Depot: say 30 days in cold store	0.43
Distribution to butchers' shops, other expenses	0.22
Loss, deterioration and interest on capital	0.22
Total	6.30

Price of Argentine Cattle in Switzerland.

Cost of importing a bullock to Berne or Lausanne.

	£	s	d
Shipping from Buenos Ayres to Genoa	5	7	0
Feeding	2	0	0
Expenses of unloading		5	6
Carriage from Genoa to Lausanne or Berne	1	5	6
Customs duties	1	5	6
Various expenses		7	0
Total	£10	10	6

The above figures refer to beasts which gave 715 lbs. of meat on slaugh ing; this was sold at nearly 8½*d* per lb. *i.e.* £25 2*s*; deducting the expe there remains £14 11*s* 6*d* for the price of the beast at Buenos Ayres.

178 – Importation of Cattle and Meat from the Argentine to Italy.

1. ZABALA, ROMULO. Importación de ganado y carnes argentinas al Reino de I — *Republica Argentina, Boletin del Ministerio de Relaciones Exteriores y Culto*, XXXVI, No. 1, pp. 127-139. Buenos Aires, 1912.

2. ACEVEDO, EDUARDO. Exportación de ganado á Italia. — *Revista de la Asoci rural del Uruguay*, Year XI,I, No. 9, pp. 691-696. Montevideo, September 1912.

1. — Italy holds the first place among European countries as an imp ter of Argentine cattle, and is second only to Belgium as an importe sheep. The sale of Argentine beasts and meat is spreading all over Ita but at present it is of most importance in Liguria, Piedmont and Lombar Tuscany is furnished from the port of Leghorn, to which the beasts are shipped from Genoa; the writer considers that this reshipping might avoided, and that Leghorn is a sufficiently important centre of impor tion to have a direct service. The cost of reshipping from Genoa to Legh is 7*s* 6*d* per head for cows and bullocks and 14*s* for bulls, plus 5 per ce for the captain of the ship.

Italian customs duties on live cattle.

Bullocks	30*s*
Bulls	14*s* 3*d*
Cows	
Calves	6*s* 3*d*

Current prices for live Argentine cattle delivered in Leghorn.

	per cwt.
Steer calves	36 *s*
Bullocks of 30 months, of at least 6 cwt.	40 *s*
» from 5 months to one year.	40 to 44 *s*
Cows and heifer calves	32 to 36 *s*

2. — In 1911 the imporation from the Argentine to the port of Genoa 33 846 steers, 12 428 wethers and 4 750 tons of frozen meat. The mortal- on board in the early part of the year was 6 to 10 per cent., but later ll to 2 per cent owing to improvement in the conditions. The tariff va- between £4 and £5 12 *s* per head, and rose temporarily even higher than latter figure. Insurance *f. a. p.* (against extraordinary losses) costs 1 cent; *c. a. p.* insurance (for ordinary mortality) is not undertaken Italian companies, but English ones undertake it at various prices h as 6 per cent., with 2 per cent. returned if no claims are made). rance is reckoned on a basis of £13 17 *s* 6 *d* to £15 17 *s* 6 *d* per head. average price for live beasts at Genoa is 34 *s* per cwt.; or after the oms duty is paid 38 *s*. In the meat-marts at Genoa the price of beef bout £4 per cwt. for Italian and French, and about £3 8 *s* for Ar- tine.

The Dead Meat Trade.

OULSTON, O. W. H. in *The Department of Agriculture and Technical Instruction for Ire- nd: Journal*, Vol. XIII, No. 1, pp. 27-36. Dublin, October 1912.

The value of the meat consumed in England between the years) and 1862 was 2*s*. 6*d*. per inhabitant per year, while in the period 1905- 1 it rose to 21*s*. 7*d*. The value of the meat imported during these periods rose from £3 584 000 to £48 042 000. While in 1897 the amount ving cattle imported, namely 4 000 000 cwts. exceeded by much the ntity of beef imported (3 500 000 cwts.), in 1911 the former sank to 0 000 cwts. and the latter rose to 8 000 000 cwts. A similar change place with mutton.

These variations are due principally to two causes. The exporta- of living animals is always liable to interruption by the outbreak me disease leading to the prohibition of imports by other countries. equently, when the introduction of dead meat has once begun no one s to go back to the exportation of living animals. The second reason at the cost of transport of dead meat, both by rail and by ship, is iderably inferior to that of living animals. Besides which there is advantage that with the dead meat trade other industries can be ected, such as converting some of the offal into useful food stuffs, er tanning, the manufacture of soap, margarine, glue, horn combs, lizers, etc. All these reasons contribute to give the dead meat trade oad and firm basis in the Smithfield market.

The buildings of this, the greatest meat market in the world, cover rea of about 10 acres, and include 344 butchers' shops with a staff of

about 5000 persons. The amount of meat it dealt with in 1907 419 037 tons and in 1911, 435 316 tons. Of this mass of meat 77.2 per came from the colonies and from abroad, of which 80 per cent. was in ted in cold storage. Argentina provides the greatest quantity of whilst New Zealand is the greatest purveyor of mutton, though Au lia sends nearly as much. The United States and Denmark hold first place as providers of bacon and hams, while Holland sup the greatest quantity (80 per cent.) of fresh pork. In the United K dom itself for a long time past Scotland has forwarded the best qual of beef and mutton. In particular, Aberdeen sends to Smithfield, in cially built railway cars, great quantities of meat, which command highest prices.

In Holland the slaughter houses which kill pigs for exportation situated as near as possible to the ports. The dead pigs are hung in r on hooks in heavy cases and so carried by rail or ship. To every sla ter house veterinary surgeons are appointed by the Government to ex ine the meat as to its fitness. The offal is also sent to London. writer has visited several large slaughterhouses in Holland which deal with 2000 to 3000 pigs per day. He believes that Ireland also c successfully export fresh pork and mutton to England if the same m sures as are current in Holland were adopted.

Though the trade in live stock between Ireland and England p sents some advantages, such as the short distance for sea transit from p to port, and the formed connection between shipper and consumer, the other hand greater advantages are offered by the dead meat tra namely:

1. — Its special value at periods of disease outbreak, when live stock trade is temporarily stopped.

2. — The avoidance of the loss of weight and deterioration in q ity inevitable to the live system.

3. — The higher price commanded by really prime finished m at Smithfield as proved by practical tests.

4. — The educational effect of a dead meat business on Irish feeder, by showing him the profit to be realised by rearing and fe ing cattle of the best quality and finishing them well.

5. — The probability that a trade that has been found profita by Scotch feeders, who finish largely Irish stores, would be still more to Irish farmers who produce the stores themselves.

6. — The establishment of subsidiary industries that would rendered possible by the dead meat trade and would offer a considera amount of employment.

The hides of cattle slaughtered in Ireland are either worked in the Irish tanneries or exported chiefly to Liverpool, Manchester a Glasgow by English firms and brokers. A large proportion of the Ir hides are ultimately sent to America.

The fat is utilized to a certain extent in Ireland, but only for the manu facture of soap, while in Hamburg for instance the fat is refined and grad

these qualities for the production of margarine, lard and machine and thus more profitably disposed of. The blood also in Hamburg for the preparation of sausages, molasses feeds, and manure, in Ireland (with the exception of Dublin) it is thrown onto the manheap.

In Ireland the heads, tails, tongues, hearts and livers are sold for and broth making, while in marketing centres they command much er prices.

The average price paid for the offal of prime beef in the London mar- 50s. In the year 1908 Ireland shipped to English and Scotch ports 34 head of cattle and 183 485 head were killed for home consumption. ng the value of the offal at £2 10s. per head, the value of the raw rial supplied to the United Kingdom equals over £200 000. In the year 725 557 sheep were exported, and the offal value of these taken each would represent an additional £290 000. There can be little t that, if these offals could be retained and worked up in Ireland, ould considerably enhance the present value of the cattle rearing stry to the country.

The Sale of Cattle for the Butcher and the La Villette Market.

ALES.: La vente du bétail de boucherie et le marché de la Villette. — *Bulletin des ues de la Société nationale d'Agriculture de France*, Vol. 72, No. 8, pp. 756-763. ris, 1912.

The market of La Villette serves as a centre for the sale of cattle he butcher and of meat for the supply of Paris, as it is situated at unction of the railway-lines connecting the cattle-raising districts ntral and Western France with North and East France, where this stry is little practised. It is thus the meeting-ground for buyers ellers from a large tract of country. On account of the size of the , the supply and demand are always equal. The market is open l who wish to buy or sell cattle. Thus the small proprietors can ar- among themselves and send one of their number to La Villette ll their cattle, if they do not care to entrust the matter to a middle-

The writer gives details of the arrangements and selling-methods a market and mentions the changes in prices. From 1899 to 1910, rice of meat rose, on account of the increased demand for this article t, the general increase in the production cost and the demand from d. In 1911, the price again rose, but without in any way benefit- e producer, for the return from cattle was very little owing to the pro- d drought and a renewed outbreak of foot-and-mouth disease. The illette market thus affords a gage of the condition of cattle breeding. it has been alleged, that the market by its cattle trade promoted pread of the foot-and-mouth disease. The sending of cattle there for a time forbidden, but this prohibition was soon cancelled, owing bad effect on the cattle trade and its inefficiency from a prophylactic point.

It was then proposed to build slaughterhouses in the centres of duction and to have cattle markets attached where the animals wo be sold. These markets, however, proved disastrous for the seal who were obliged to sell their animals for any price which was offe Soon, however, the slaughterhouses became the property of large Jo Stock Companies, which by the formation of trusts, were enabled to force whatever prices they chose on the producer and the consumer. Th the price of meat did not go down. The middlemen of the La Villt market were only replaced by the agents of the Slaughterhouse Societ Also the transport costs were not diminished, for the slaughterhou were obliged to get their cattle from a distance of 30 to 60 miles or mo and further, the danger of spreading foot-and-mouth disease remain the same.

It was therefore best to improve the existing markets in the la towns and especially that of La Villette. In order to accomplish the last purpose, it is necessary to rebuild and enlarge the railway-station a provide the slaughterhouses and market with their own sidings for lo ing cattle. The slaughterhouses must be better equipped with dis fecting appliances and have more cold-storage chambers.

If the conditions and means of transport were improved, and t lice-regulations regarding foot-and-mouth disease extended, this tant question, which is so much occupying the minds of agric organisers, would soon be solved.

181 - The Making and Composition of Tunisian Wines.

MARCILLE, R.: La Vinification et la Composition des Vins de Tunisie. — *Bul mestriel de la Direction Générale de l'Agriculture*, Year 16, No. 63, pp. 128-149. Second Quarter, 1912.

In the first part of his paper, the writer gives an account of th ferent processes of wine-making: he treats of the use of sulphurous the products which are utilized, the determination of sulphurous the changes which it undergoes, and its relation to alcoholic ferment and finally he suggests clarifying the must by centrifugal force Marcelle has himself made some preliminary experiments in this tion, using small dairy separators. These experiments, although in fect, seem of interest, for they allow of its being concluded that lar dustrial machines would furnish musts containing in suspension pectic matters together with fine cellulose particles from the pul

In spite of the violent agitation which the liquids undergo on le the apparatus, the loss of the free sulphurous acid of the musts is rel ly very small. On the other hand, the musts to be submitted to c fugal action should only receive small quantities of sulphurous since the economy of the process consists precisely in permitting liquids to ferment immediately after purification through passing the turbine.

The second part of the article in question treats of the compos of Tunisian wines, and shows that certain characteristics which

cause these natural products to fall under the suspicion of having
ulterated. Numerous tables of analyses and statistics of results
d in the Laboratory of Agricultural Chemistry in Tunis give the
which the writer has based his opinion; the latter is of the more
as he gives information and arguments, of which we reproduce
st important.

e Tunisian vineyard differs not only from the French, but also
hose of the Departments of Algiers and Constantine. In the
ountries, the vine is usually planted on rich plains, where the rain-
eeds 600 mm. (24 in.) and the vintage is often more than 880
per acre. In Tunis, nine-tenths of the plantations are situated
icts with a rainfall of less than 450 mm. (18 in.), and the average
f the vines in bearing is only 260 gallons. From these differences
rise variations in the composition of the wines, all the more so
local climatic conditions produce differences in the physiological
es of ripening. The functions of the grapes are often hindered
scorching of the organs which supply them with acids. Consequent-
ng to the effect of the long dry summers, and especially when heat
occur before the period of maturity, a must is produced which is
sugar, and the wine has a low alcohol content and at the same
very deficient in acid.

ese accidents are of annual occurrence in most of the vineyards.
s true that certain stocks like Aramon, Monrastel, and Carignan
pecially affected, yet cases of the same kind occur in the crop of
e district. This for example was observed in the vintage of 1911.
ther important differences may be mentioned, showing that the
of Blarez and Halphen cannot well be applied to Tunisian wines.
ipening of grapes, of which the synthetic activity appears to in-
under the influence of intense insolation, differs in its progress
what has been observed in France. From the time of the grapes
g colour, the acid cannot accumulate in the fruit and when the ri-
g occurs steadily the alcohol content of the wines increases with
cidity. The composition even of the musts must also differ, for the
on of several grams of acid sometimes makes very little difference
wine. In an experiment made at the Colonial School of Agricul-
t Tunis the addition of 2.75 gr. of citric acid had increased the final
nt of fixed acid in the wine from 0.3 to 0.4, and 3 gr. of tartaric
o 0.7. This shows how arbitrary it would be to try and judge of
ltering by subtracting the added acid from the acidity of the wines.
n the other hand, the statistics of the analytical results show that
samples examined during the last five years, 27 per cent. of the
an red wines and 40 per cent. of the white deviated by more than
om Halphen's rule and by 15.9 and 28.5 from that of Blarez. These
es came exclusively from well-known proprietors.

he wines from young vines give very low figures as regards alcohol
t, acidity and the amount of dry substances present; on the other

hand, some grapes like Alicante, Ugni, and Chasselas are rich in sug but often poor in extracted matter.

The presence of free tartaric acid has been detected in white and wines to which citric acid has not been added ; the red vintages of and 1911, however, show no trace of it.

The great majority of Tunisian wines, from different sources as to vine and origin, give a dextro-rotary deviation ; the reverse is case with French wines.

Normal boric acid occurs in Tunisian wine in the proportions of 10 to 35 mgr. per litre ; and manganese was present in one sample in exceptional amount of 20 mgr. ; this same sample contained 25 of iron. According to the writer, this might give a means of di guishing normal from added manganese.

PLANT DISEASES

GENERAL INFORMATION.

The National Quarantine Law of the United States of America Regulations.

ational Quarantine Law. An Act to regulate the importation of nursery stock, other plants and plant products; to enable the Secretary of Agriculture to establish maintin quarantine districts for plant diseases and insect pests; to permit and ate the movement of fruits, plants, and vegetables therefrom, and for other purposes.
e Monthly Bulletin of State Commission of Horticulture, Vol. I, No. 10, pp. 791-795. mento, California, September 1912.
. *S. Department of Agriculture, Office of the Secretary, Federal Horticultural Board*, *ar* No. 41 (Revised). Washington, December 20, 1912.
. *S. Department of Agriculture, Office of the Secretary, Federal Horticultural Board*, *s of Quarantine*. No. 1, Washington, September 19, 1912.
tice of Quarantine No. 2 (Domestic), September 28, 1912.
tice of Quarantine No. 3 (Foreign), September 28, 1912.
tice of Quarantine No. 4 (Domestic), November 13, 1912.

1. — It shall be unlawful for any person to import or offer y into the United States any nursery stock unless and until a shall have been issued therefor by the Secretary of Agriculture, uch conditions and regulations as the said Secretary of Agricul- y prescribe, and unless such nursery stock shall be accompanied rtificate of inspection, in manner and form as required by the y of Agriculture, of the proper official of the country from which ortation is made, to the effect that the stock has been thorough- cted and is believed to be free from injurious plant diseases and ests; the Secretary of Agriculture shall issue the permit for any ar importation of nursery stock when the conditions and regula- prescribed in this act shall have been complied with; nursery ay be imported for experimental or scientific purposes by the De- t of Agriculture upon such conditions and under such regulations id Secretary of Agriculture may prescribe; and further, that nur- ck imported from countries where no official system of inspection stock is maintained may be admitted upon such conditions and uch regulations as the Secretary of Agriculture may prescribe.

2. — It shall be the duty of the Secretary of the Treasury y to notify the Secretary of Agriculture of the arrival of any

nursery stock at port of entry; the person receiving such stock at
of entry shall, immediately upon entry and before such stock is del
for shipment or removed from the port of entry, advise the Sec
of Agriculture or, at his direction, the proper State, territorial, o
trict official of the State or territory or the district to which such n
is destined, or both, as the Secretary of Agriculture may elect, of the
and address of the consignee, the nature and quantity of the stock
proposed to ship, and the country and locality where the same was g
The same formalities are required for the transport from one Sta
another of the United States of any imported nursery stock, unless
until such imported stock has been inspected by the proper offici

Secs. 3 and 4. — The packages containing nursery stock shall be
ly and correctly marked to show the general nature and quanti
the contents, the country and locality where the same was grown
name and address of the person shipping or forwarding the same,
the name and address of the consignee.

The same formalities are necessary for the transport from one
or territory or district of the United States into any other State or
tory or district of any such imported nursery stock, unless it h
inspected by the proper official.

Sec. 5. — Whenever the Secretary of Agriculture shall de
that the unrestricted importation of any plants, fruits, vegetable
bulbs, seeds, or other plant products not included by the term
sery stock" as defined in section six of this Act may result in th
into the United States or any of its territories or districts of in
plant diseases or insect pests, he shall promulgate his determ
specifying the class of plants and plant products the importation o
shall be restricted and the country and locality where they are
and thereafter, and until such promulgation is withdrawn, such
and plant products shall be subject to all the provisions of the fo
sections of this Act; provided, that before the Secretary of Agr
shall issue such promulgation, he shall, after due notice, give a
hearing, at which any interested party may appear and be heard
in person or by attorney.

Sec. 6. — The term "nursery stock" shall include all field
florists' stock, trees, shrubs, vines, cuttings, grafts, scions, bud
pits and other seeds of fruit and ornamental trees or shrubs, an
plants and plant products for propagation, except field, vegetab
flower seeds, bedding plants, and other herbaceous plants, bulbs, an

Sec. 7. — Whenever, in order to prevent the introductio
the United States of any tree, plant, or fruit disease or of any in
insect, new to or not theretofore widely prevalent or distributed
and throughout the United States, the Secretary of Agricultur
determine that it is necessary to forbid the importation into the
States of any class of nursery stock or of any other class of pla
plant products, and notwithstanding that such class of plants o
products be accompanied by a certificate of inspection from the c

portation, before the Secretary of Agriculture shall issue such gation, he shall, after due notice to interested parties, give a hearing, at which any interested party may appear and be either in person or by attorney; provided further, that the qua- provisions of this section, as applying to the white-pine blister *eridermium strobi*), potato wart (*Chrysophlyctis endobiotica* = *Syn- n endobioticum*), and the Mediterranean fruit fly (*Ceratitis capi-* hall become and be effective upon the passage of this Act.

. 8. — The Secretary of Agriculture is authorized to quarantine any erritory, or district of the United States, when he shall determine t that a dangerous plant disease or insect infestation, new to or retofore widely prevalent or distributed within and throughout ited States, exists in such State, territory or district; notice of uarantine shall be given to interested parties and to the press. uarantined State or territory or district shall not export plants s of plants unless they shall have conformed to the provisions taken connection by the Secretary of Agriculture and which refer to the ion, disinfection, certification, and method and manner of de- nd shipment of the class of goods.; provided, that before the Sec- of Agriculture shall promulgate that it is necessary to quarantine ate, territory, or district, he shall, after due notice, give a public ; at which any interested party may appear and be heard, either on or by attorney.

. 9. — The Secretary of Agriculture shall make and promulgate les and regulations as may be necessary for carrying out the pur- f this Act.

tions 10 and 11 establish the penalties incurred by offenders this Act. They consist of fines not exceeding $500 (about £100) terms of imprisonment not exceeding one year.

. 12 appoints a Federal Horticultural Board for the purpose ying out the provisions of this Act.

. 13 appropriates the sum of $25 000 (about £5000) for the s and objects of this Act.

. 14. — This Act shall become and be effective from and after t day of October, nineteen hundred and twelve.

— The following Regulations concerning the importation of stock were made by the Secretary of Agriculture of the United on September 18th, 1912.

finition. — See Section 6 of the said law. Furthermore, "All plants and parts thereof for propagation or planting are included the term 'nursery stock.'"

rmits for Importation. — Persons wishing to import nursery stock pply to the Secretary of Agriculture for a permit, stating the gen- ture and quantity of the nursery stock, the State, district or lo- here grown, the name and address of the exporter, together with ne and address of the importer in the United States and the pro- ort of entry. Applications for permits should be made in advance

of the shipment of the nursery stock, but if, through no fault of t porter, stock shall arrive before the issue of a permit, the stock held in customs custody at the risk and expense of the importer, period not exceeding ten days, pending the issue of a permit.

On approval by the Secretary of Agriculture of an applicati the importation of nursery stock from countries which maintain a stock inspection, a permit will be issued. Permits will expire on th day of June of the year following the date of issue.

Entry of Nursery Stock. — Entry of nursery stock will not be al unless accompained by a certificate issued by a duly authorised of the country from which it is shipped, stating that it has been roughly inspected by him, and was found to be free from injurious diseases and insect pests. In the case of stock to be shipped be October 1st and May 31st this inspection must be made on or October 1st, and for stock shipped during the growing season i tion must be made not more than 30 days prior to date of ship Until July 31st, 1913, however, the usual inspection certificate co the previous growing season will be accepted. When the country which any nursery stock is shipped maintains no official inspe articles for which a permit has been issued will be admitted through the ports of New York, San Francisco, Seattle, Jackso and New Orleans, after examination by inspectors of the Depart of Agriculture at the port of arrival, if found to be free from diseases and insect pests.

Nursery stock, if found infected, may be treated or destroye circumstances require.

Foreign Certificate of Inspection. — Certificates of inspection be accepted if countersigned by duly authorised officials of foreign tries or their agents. On and after July 1st, 1912, certificates must the date of inspection, name of the grower, the district or locality country where grown, a statement that the stock has been insp by a duly authorised official, and been found, or believed to be, free dangerous insects and plant diseases, and must bear the name of th sponsible inspection official for the country of origin.

Declaration. — On and after December 1st, 1912, all ship of nursery stock to the United States from countries which maintai official system of nursery stock inspection must be accompanied declaration of the shipper, produced before an American consular o The declaration must contain a statement by the shipper that he be the nursery stock to contain no injurious plant diseases or insect the district or locality and country where grown, the name of the gr the port of origin, and destination of the consignment, the date spection of the stock, and the name of the inspector, and the nu of the permit issued by the Secretary of Agriculture.

On and after December 1st, 1912, consular invoices covering ments of nursery stock to the United States must bear the number

ssued by the Secretary of Agriculture, and have attached to
e shipper's declaration.

—Notice No. 1 prohibits the importation into the United States
eat Britain, France, Belgium, Holland, Denmark, Norway, Swe-
ssia, Germany, Austria, Switzerland and Italy, until further
of the following species and their horticultural varieties, *viz.*,
ne (*Pinus strobus* L.), western white pine (*Pinus monticola* Dougl.),
ne (*Pinus lambertiana* Dougl.), and stone or cembrian pine (*Pinus*
.). The object of this prohibition is to prevent the introduction
United States of the tree disease known as "white pine blister
(*Peridermium Strobi* Kleb.).

—Notice No. 2 prohibits the movement from the Territory of
into any other State of the United States of America of Alligator
Carambolas, Chinese inkberry, Chinese orange, Chinese plums,
erries, Damson plums, Eugenias, Figs, Grapes, Grapefruit, Green
, Guavas, Kamani seeds, Kumquats, Limes, Loquats, Mangos,
range, Mountain apple, Natal or Kaffir plum, Oranges, Papaya,
, Persimons, Prickley pears, Rose apple, Star apple, String
nd Tomatoes. The object of this prohibition is to prevent the in-
ion into other States of the Mediterranean Fruit Fly (*Ceratitis cap-*
which is new to and not widely prevalent in the United States.

—Notice No. 3 prohibits the importation into the United States,
rther notice, of the common or Irish potato (*Solanum tuberosum*)
ewfoundland, the islands of St. Pierre and Miquelon, Great Britain
land, Germany and Austria-Hungary, where the disease known
to wart, potato canker, black scab, etc. (*Chrysophlyctis endobio-*
hilb., = *Synchytrium endobioticum* (Schilb.) Perc.) is declared to

-Notice No.4 quarantines the States of Maine, New Hampshire,
usetts and Rhode Island for Gipsy Moth (*Porthetria dispar*) and the
f Maine, Vermont, New Hampshire, Massachusetts, Connecticut
de Island for Brown-Tail Moth (*Euproctis chrysorrhoea*).

interstate movement of 1) coniferous trees, such as spruce
ock, pine, juniper (cedar) and arbor-vitæ (white cedar) and parts
and decorative plants, such as holly and laurel, and 2) forest
oducts, including logs, tan bark, posts, poles, railroad ties, cord-
d lumber, and field-grown florist's stock, trees, shrubs, vines,
and other plants and plant products for planting and propagation,
g buds, fruit pits, seeds of fruit and ornamental trees and shrubs,
getable and flower seeds, bedding plants and other herbaceous
nd roots, from the quarantined areas is prohibited until plants
nt products have been inspected by the U. S. Department of Ag-
e and pronounced free from the said insect pests.

183 - **The Congress of the "Defensa Agricola" at Montevideo (Uru in April 1913.**

Communication from the Director of the "Defensa Agricola" of Montevideo to the national Institute of Agriculture.

Owing to the initiative of the "Ministerio de Industrias" the gress of the "Defensa Agricola" will be held at Montevideo in 1913. Argentina, Paraguay, Brazil and Chile have been invite send delegates.

The following are the subjects proposed for discussion:

a) The control of locusts.

1. Given the present knowledge respecting the permanent and permanent zones where locusts occur, is collective international a possible in these districts?

2. The contribution of each State for the purpose of ascerta whether there exist in their respective territories centres of distrib of locusts.

3. The form which co-operative international action against centres could take, should such action appear desirable.

4. The proportion and the manner in which each State could p cipate in such action.

5. Is it best to adopt an official scheme of a permanent char or to treat each case as it occurs and in the manner which seems suitable?

6. Measures for ascertaining the existence of other species of tory locusts, besides *Schistocerca paranensis*, against which it is nec to generalize the international measures of control. The inform already in the possession of the Congress and any further data are communicated respecting the existence of any at present undeter species in the districts of South, North and West Brazil, in the of Rio Janeiro, Paraná, Matto-Grosso, Parayba and Rio Grande di te. The manner of completing the investigations on this point.

7. The methods of controlling locusts practised in different tries and especially in those represented at the Congress. Meth destruction: mechanical, physical (fire) and toxic. Biological a The utility of communicating generally the methods and systems truction in the case of auxiliary, or collective intervention, or of co-op work for the destruction of the pests, especially in neighbouring tries.

b) Auxiliary telegraphic assistance.

8. The institution of an international telegraphic service, usin same code, for daily information respecting the condition and move of the locusts.

9. The advisability of extending this service, and using it al other purposes, such as for giving information concerning other ag tural pests.

10. Places which might serve as centres of information and

is entrusted with the regular transmission of news could be estab-

1. The installation of a central service deputed to receive all data o compile a demonstration table showing the various phases of the on, with indications as to the frequency of the flight of the insects, numbers, the distance they fly, their retrogression, etc.
2. Could meteorological observations for each country be included s service?

c) The control of other agricultural pests.

3. The advisability of devising a scheme of control for all the other which attack the crops. The measures adopted in each country he results obtained.
4. The adoption of a uniform system in the service of the inspection ported vegetable products, with the view of making more stringent onditions of obtaining certificates of origin.
5. The advisibility of maintaining constant intercourse between overnments of the adhering countries and the methods of attaining nd.
6. The adoption of preventive measures against the invasion of pests.
7. The organization of a service of information which will assist eventing the introduction of new diseases by means of isolating ed and suspected areas.
8. The measures of assuring, to the persons charged with the export e, the efficiency necessary for exporting goods in a satisfactory tion.

d) Protocol of the Convention.

9. The advisibility of leaving the protocol of the convention open, ler that other South American countries may join.
0. The manner and date at which the approved measures will come orce, their duration and the method of proroguing them.

he delegates of each country can lay other schemes before the Con-

DISEASES NOT DUE TO PARASITES AND OF UNKNOWN ORIGIN.

The Effects of Road-Tarring on Trees at Leghorn (1).

RALLI, E.: Sull'effetto dell'incatramatura delle vie a Livorno. — *Rivista di Patologia ale*, Year 5, Nos. 21.-22, pp. 321-323. Pavia, 1912.

Then the new railway-station was built at Leghorn a central road ade leading to the town, parallel with which were side roads shaded l elms, holm-oaks and planes.

DE
DUE
SITE
UNE
GIN.

(1) See No. 967, *B.* June 1912.

A portion of the lateral roads was tarred, as was also a part of the m road, where the traffic was continuous. At first, nothing abnormal noticed, but at the beginning of 1912, the old elms did not bud as u and the leaves of the holm-oaks and other trees were partially withe As the season advanced, the withering increased, till in July and Aug the elms had turned quite brown, and the holm-oaks were so in p their leaves looking as though they had been burnt, while the plan which were already injured by *Lithocolletis*, showed also signs of bei attacked by this new disease.

The macroscopic and microscopic observations made by the wri on material sent to him, or later collected by himself, agreed with the p ceding investigations.

BACTERIAL AND FUNGOID DISEASES.

185 - The Structure and Development of "Crown Gall": A l Cancer (1).

SMITH, ERWIN, F.; BROWN, NELLIE, A., and MCCULLOCH, LUCIA: *U. S. Dep of Agriculture, Bureau of Plant Industry, Bulletin* No. 255, 60 pp., 2 figs., CIX Washington, 1912.

The parasite of crown gall (*Bacterium tumefaciens*) has been isolate the writers from 24 species belonging to 14 families of phanerogams. S species have resisted infection. The parasite has been grown in pure cul on a variety of media and its morphology and cultural peculiarities termined. It has also been stained within the tissues of the tumor and form and locus therein determined. The morphology and biolo peculiarities of the tumor growth have been studied. The tissues of gall multiply excessively and in opposition to the best interests of the pl The galled tissue, which is often of a soft, fleshy nature, is much sub to decay. It is not usually corked over, and this absence of a protec surface allows the ready etrance of water and of other parasites. tumor originates in meristem, usually in the cambium region. It perish within a few months or continue to grow (parts of it) for ye The tumor consists, or may consist, not only of parenchyma but als vessels and fibers, *i. e.*, it is provided with a stroma which develops g ually as the tumor grows. A proliferating tumor usually contains only meristem but pitted vessels and sieve tubes; it may also con wood fibers, but does not always. The tumor sends out roots (tu strands) into the normal tissues. These may extend for some dista from the tumor — how far is not known. These strands consist of m istem capable of originating medullary rays, tracheids, and sieve tu In the daisy the strand passes through the protoxylem region of the st

(1) See No. 2967, *B.* Aug.-Sept.-Oct. 1911.

(LL).

ich in chloroplasts. It usually takes a deeper stain than the sur-
ng tissues, from which it is sharply delimited. A considerable
it consists of unripe, actively vegetating cells. In the substance
e deep-lying strands secondary tumors develop. These gradually
their way to the surface.

he secondary tumors tend to take on the structure of the primary
e. g., if the latter is in the stem and the former in a leaf, the secon-
umor shows a stem structure.

he stimulus to tumor development comes from the presence of the
e within certain of the cells. Apparently it is not in all. The or-
has not been observed with certainty outside of the cells, either
vessels or the intercellular spaces, nor is it abundant in the cells.
y copious inoculations have to be made to ensure cultures.

nder the microscope it can not be made out in unstained sections
ny certainty, and most bacterial stains also fail to differentiate it
tissues. It is best observed in tissues impregnated with chloride
l.

y repeated inoculations through a series of years plants were obtained
appeared to be more resistant to the disease than check plants, but
ubsequent inoculations on descendants of these plants numerous
eveloped primary and secondary tumors appeared, so that the re-
e must be regarded either (a) as of a fugitive nature, or (b) as of a
ade easily overcome by a more virulent strain of the parasite. That
ltures used for these subsequent inoculations came from a more
nt strain may be assumed both because they were plated from a
which appeared on one of the most resistant plants and because the
s tried on a great number of plants produced primary tumors very
y and showed an unusually strong tendency to develop secondary
s.

he relation between the host and the parasite may be regarded as a
osis in which the parasite has the advantage.

he bacterium is a soil organism and planters should aim to keep their
free from it by refusing to plant infected stock.

urserymen should plant on uninfected land and carefully avoid heel-
od stock into soil which has previousy received infected plants.
rymen have been largely responsible for the dissemination of this di-

he organism is a wound parasite. Its entrance is favored by careless
g (Hedgcock) and by the presence of borers, nematodes, etc.

hese galls occur on the roots of Legumes and have been mistaken
nitrogen root nodules.

he development of this disease is regarded as closely paralleling
akes place in cancer of men and animals.

here are no true metastases in crown gall, but this does not militate
t the comparison, for whether a cancer shall be propagated by
g islands of tissue, or only by tumor-strands, appears to be a se-

condary matter depending on the character of the host tissues rather on the nature of the disease. The essential element is the internal ulus to cell division.

186 - **The Effect of Bordeaux Mixture on the Spores of *Spicaria far* var. *verticilloides*, a Parasite of the Larvae of Vine Tineids**

FRON. Note sur l'influence des bouillies cupriques sur les spores des champig groupe des Isariées. — *Bulletin des Séances de la Société nationale d'Agriculture de* Vol. LXXII, No. 8, pp. 742-746. Paris, 1912.

It has been suggested that cupric mixtures, used as a remedy the different diseases of the vine, hinder the propagation of the sp of the fungi parasitical on the insects which attack this plant.

The writer therefore undertook investigations as to whether the of *Spicaria farinosa* var. *verticilloides*, which seems to attack the of the Tineids *Conchylis ambiguella* ad *Polychrosis botrana* very viru are able to develop in contact with Bordeaux mixture, or after a or shorter immersion in it.

The results of numerous experiments showed that the fungus resisted the prolonged action of Bordeaux mixture ; they were not by a fifteen hours' immersion in a " 5 per cent." mixture, and the minated normally on the substratum in spite of the mixture being sp on the surface of the nutritive medium. These facts correspond to already observed in the case of other fungi.

It yet remains to be seen whether the infective power of the f grown under these conditions is modified as regards its host.

187 - **" Iliau ": a Disease of Sugar Cane in Hawaii.**

LYON, H. L. Iliau, an Endemic Cane Disease. — *Report of Work of the Experim tion of the Hawaiian Sugar Planters' Association, Pathological and Physiological Bulletin* No. 11, 32 pp., 10 figs, 1 plate. Honolulu, Hawaii, 1912.

The name " iliau " is a native term for a cane disease pecu Hawaii. The most conspicuous symptom is a binding of the leaf into a tight unyielding jacket about the stem, which prevents the making any further growth.

The disease is produced by a fungus whose perfect form is by the writer *Gnomonia iliau* n. sp. ; the imperfect form, prev discovered, being known as *Melanconium iliau*. The *Gnomonia* of fruiting body is of infrequent occurrence. The ascus spores ar charged into the air and disseminated by the wind, while the *M conium* spores are formed in the interior of the diseased shoots an largely responsible for the local spread of the infection ; they are rel however, with the disintegration of the shoot. This takes place comparatively short time, if the affected shoot becomes soaked with w The *Melanconium* spores do not germinate readily in water, and c quently are well adapted to water dissemination. They retain vitality for long periods if protected from the sun, but are effectually troyed if exposed for a short time to its direct rays.

lau is a disease of young canes. The fungus gains entrance to
it by entering the leaf bases, which join the stem below the
e of the soil; once inside the tissues, it causes the above-mentioned
in the latter. Other things being equal, iliau causes a greater
lity among plant canes than it does among rattoons. Cane stools
ots which have been weakened by any cause are rendered more
tible to the disease, which flourishes only during cool, damp wea-
Demerara seedlings are the most resistant canes now being grown
large scale, and consequently are good varieties to plant in fields
the disease is apt to flourish.
he most effective precautions that can be taken to minimize the
r of an iliau epidemic are thorough working of the soil and early
ngs; these measures should be practised in addition to the ordinary
usually taken to ensure a good stand of healthy cane.

ASITIC AND OTHER INJURIOUS FLOWERING PLANTS.

Fourth International Congress of Rice Growers at Vercelli, aly (1912): the Control of Weeds in the Rice-Field.

VELLI, N. Il IV° Congresso risicolo internazionale. — *Il Giornale di Risicoltura*, Year , No. 23, pp. 364-365. Vercelli, December 15, 1912.

mongst the orders of the day passed at the Fourth International ss of Rice Growers at Vercelli in 1912, were the following:
ubject III. — *The Control of Weeds in Rice-fields*, Part I. — *The which infest the Italian Rice-fields.* Report by Prof. G. Jacometti.
The Congress considers, that it is necessary:
To continue the researches of Prof. Jacometti relating to break- e life-cycle of the weeds which infest rice-fields, and that such re- es should be carried on in all the rice-growing districts of Italy.
To continue to weed carefully and regularly, not only at the usual , but during the whole vegetative period of the rice.
To clean carefully all imported seed, both of rice and of other crops, e rice-growing districts.
To invite the Government and the Agricultural Institutions to tage rice-fields being kept clear by means of propaganda, compe- , prizes, etc.".
art 2. — *The Best Systems for the Control of Weeds in Rice-Fields.* t by Profs. V. Alpe and E. Ferrari. "The control of the weeds invade rice-fields should be practised:
1) *Outside the rice-field*: by preventing the seeding of weeds grow- the meadows, among maize, or on the banks dividing the fields, hich have escaped the scythe and the weeder, — not using the as litter for animals, — using only such stable manure for rice- as has undergone prolonged fermentation.

"2) *In the rice-field*: by only sowing seed which has been fre weed seeds; by sowing and growing the rice for a short time, wh sible, in dry soil; by regulating the water supply in such a manne hinder the development of the weeds without harming the cere by turning the heaps of weeds, which have been collected during th ing, at the right time to prevent their sprouting again."

"The Congress passed a vote that the above-mentioned pr should be made the subject of wide-spread propaganda on the the Agricultural Institutions of the rice-growing zones."

189 - **The Blackberry-Bud Moth: a Promising Agent for Control**

COCKAYNE, A. H. in *The Journal of the New Zealand Department of Agriculture*, No. 4, pp. 372-374. Wellington, October 15, 1912.

The Blackberry (*Rubus fruticosus* L.) was introduced int Zealand as a cultivated plant; it then spread from place to place t an extent that it has now become a very serious weed. Where cu and temporary pastures form the basis of all farming operatio blackberry is not a dangerous problem. But where the bush ha converted into permanent pastures the blackberry is decidedly perni and from the cleared country it has extended to the areas of st timber, but here it is in general restricted to the outskirts.

The blackberry is spread by seed which is conveyed by an chiefly birds. The individual plants by means of their arching bra which bend down to the ground and then root, soon form extensiv penetrable thickets.

The main methods of control that have hitherto been emp have been cutting and burning, followed, in the case of pastures, by ing the young fresh growth mowed down. In country which is rough and where stumps and logs are numerous, the use of goats ha followed by excellent results. But these methods are necessarily e sive for large areas.

Up till quite recently the blackberry was singularly free from th tacks of any natural enemy that might be of value in its control. I number of years past several parasitic fungi, notably orange-rust (Ca *nitens*), have been noted as occurring sporadically, but in no cases their effects justified the opinion that any of them would prove efficac During the past two years, however, a hitherto rare native moth, *posina adreptella*, belonging to the Tortrix group, has suddenly a plied enormously, attacking the young shoots of the blackberry, and troying them to such an extent that hopes are entertained that it prove an exceedingly valuable agent in controlling the spread of b berry.

The eggs of the moth are laid in the leaf bases of the young sh or in the bud itself. The larvæ hatch very soon, penetrate the soft sue and bore through the pith for a distance of perhaps 2 inches. is followed by the complete death of the terminal shoot and consequ ly the spreading by means of pendent branches is eliminated. The p

ed remain small in size and isolated, besides which they appear
: their power of producing flowers and fruit to the same extent
unaffected ones. Perhaps the insect attacks the flower buds also,
is is a point that has not yet been investigated.

INSECT PESTS.

Papers on Coccidae, or Scale Insects. The Genus *Fiorinia* in the nited States.

SCUE, E. R. in *U. S. Department of Agriculture, Bureau of Entomology, Technical ia*, No. 16, Part V, pp. 75-82, plates X-XIII. Washington, December 6, 1912.

he genus *Fiorinia* Targioni, at the present time consists of some scribed species and 4 varieties, and of this number there are only pecies (*F. theae* Green and *F. fioriniae* Targioni) and one variety *riniae* var. *japonica* Kuwana), at present known in the United

he writer first gives a description of the genus and then describes ree species of *Fiorinia* mentioned above, discussing their synonymy; aphical distribution, food plants and natural enemies.

he tea scale (*F. theae*) is recorded on camellias in Alabama, in the ct of Columbia, Florida, Georgia, Louisiana, North Carolina and Carolina. It has been collected also in Ceylon, the Philippine ls and in various localities in India.

n the United States, this scale has only been found on camellias ea, but in India it has been recorded also on olive (*Olea glanduli-* and citrus; in the Philippines it occurs on a species of *Caryola*, n the Royal Botanic Gardens at Peradeniya, Ceylon, on *Ostodes*. lthough *F. theae* seems to show a preference for tea at Summer-South Carolina, it appears to be quite a serious pest on the camellias veral of the more Southern States, and is not infrequently found iated with *Lepidosaphes lasianthi* Green.

This scale is controlled by *Chilocorus bivulnerus* Muls., *Microweisea la* Lec. and *Cybocephalus nigritulus* Lec. On the tea at Darjeeling coccids are frequently covered by a parasitic fungus, which is doubt-n a measure effective in holding this pest in check.

Fiorinia fioriniae has a wide range of distribution and is known xur in the following countries: Algeria, Australia, Barbados, Brazil, n, China, Egypt, Europe (Belgium and Spain), Jamaica, Japan, ira (?), Mauritius, Mexico, New South Wales, Peru, United States bama, California, Colorado, District of Columbia, Louisiana, Mary-and Massachusetts), Hawaiian Islands, West Africa and Zanzibar. The most important food plants of this scale are: *Anthurium acaule*, lonias *canariensis*, *Aralia*, *Areca aurea*, bamboo, bay, *Camellia*, s *mauritiana*, *Chamaerops humilis*, coconut palm, *Cupressus*, *Cycas malis*, *C. revoluta*, *Dracaena indivisa*, ferns, *Ficus elastica*, *Ficus*

sp., *Garcinia* sp., *Hedera Helix*, Japanese Quince, *Kentia Belmo*
K. Forsteriana, *Larix* sp., *Leptospermum*, *Licuala*, *Livistona*, *P*
gratissima, *Phoenix canariensis*, *Phoenix* sp., *Phormium tenax*, *Pi*
phas macrocarpa, *Podocarpus*, *Strelitzia Reginiae*, tea (*Thea japo*

Amongst the natural enemies of *F. fioriniae* are recorded: *a*
pidiotiphagus citrinus Craw., found enclosed in the body of an a
specimen of this scale in Washington, D. C., and on *Chamaerops hum*
the same chalcid has also been reared from material on *Persea gratis*
from Honolulu, Hawaii; *b*) another species of *Aspidiotiphagus*
reared from this scale on an undetermined plant collected at Hongk
c) *Prospaltella aurantii* How., collected from this coccid on *Ficus*
at Swatow, Canton, China; *d*) *Sphaerostilbe coccophila*, the "red-he
fungus," observed in Mauritius on infested Camellias.

F. fioriniae var. *japonica*, although a native of Japan, has been
troduced into the United States on numerous occasions on infested e
greens. In September of 1908 it was collected on *Tsuga* sp. at Que
Long Island, and subsequently on Japanese hemlock at New York.
June 1909, it was observed on the fruit and leaves of *Podocarpus* s
received by the Bureau of Plant Industry from the Botanical Gard
of New South Wales. It has also occurred on *Podocarpus chine*
and *Pinus* sp. in California; on *Podocarpus Nageia* and *Abies Vei*
in the Philippines; and on *Pinus pentaphylla*, *P. Thunbergii* and *T*
Sieboldii in Japan.

191 - Parasites of Apple Weevil observed in the Valle-di-Non (Tr
Austria).

CATONI, GIGLIO.: Parassiti dell'*Anthonomus pomorum* (L.) osservati in Valle di
(Trentino). — *Bollettino del Laboratorio di Zoologia Generale e Agraria della R. Sc*
Superiore d'Agricoltura in Portici, Vol. VI, pp. 148-150, figs. I-II. Portici, 1912.

Of 3000 apple blooms gathered in April 1911 in the Valle di N
(Trent, Austria), and each containing a larva of the weevil (*Anthonom*
pomorum), in 846 or 28.2 per cent. the weevil larva was attacked by
parasite. Each of the diseased larvæ was placed in a glass tube, or
a little bag of very fine gauze. The flowers containing healthy lar
were covered with a bell-jar. At the time that the adult weevils appea
beneath the bell-jar, it was observed that from the 846 parasitized lar
four Hymenoptera emerged, in the following numbers: 647 *Pim*
pomorum Ratzb., 63 *Meteorus ictericus* (Nees), 29 *Habrocytus fascia*
Thoms and 6 *Apanteles impurus*, with a noticeable preponderance
females; 63 larvæ shrivelled up, and the remaining 38 were destroy
by a fungus determined as *Verticillium buharum*.

Experiments in France in Acclimatising some Species of *Glandina* which destroy other Gasteropods (1).

VILMORIN (de) PHILIPPE. Observations sur les Glandines à Verrières-le-Buisson. — *Comptes Rendus des Séances de l'Académie des Sciences*, Vol. 155, No. 23, pp. 1289-1294 1 fig. Paris, December 2, 1912.

BOUVIER, JACQUES. Les Glandines, Mollusques carnassiers du Mexique. — *La Nature*, Year 41, No. 2064, pp. 20-21 + 3 figs. Paris, December 14, 1912.

LAVERGNE, GASTON. Les Glandines ennemies des Limaces et des Escargots. — *Revue Viticulture*, Year 19, Vol. XXXVIII, No. 993, pp. 754-758 3 figs. Paris, December 26, 1912.

of. Bouvier has received from Mexico, and has distributed to semembers of the Société Nationale d'Agriculture de France, speci- of carnivorous snails of the genus *Glandina*, which he proposes imatize in France for the purpose of controlling the other gas- ls which infest garden plants.

the 134 species of *Glandina* so far described, 53 are natives of the s, and principally of Cuba, Jamaica, Haïti and Porto Rico; 48 co; and 8 of Guatemela; most of the rest come from other countries th America, though a few species are indigenous to the countries ng the Mediterranean. The European species do not possess, eir Americam relatives, powerful labial palps, enabling them to a carnivorous diet.

e observations of M. Philippe de Vilmorin were made on 25 ens of *Glandina olivacea* Schum. (*G. guttata* Crosse and Fischer) were kept in the open at Verrières-le-Buisson, near Paris, from o November 1912. It appears that *G. olivacea* devours snails vidity, but does not seem to eat slugs, at any rate those of the *Arion*; it does not touch plants. It pairs and lays eggs in the one. It remains to be seen whether these eggs hatch out and r the adults are able to stand the winter temperature. At —4°C. ied, while others went into a torpid condition.

Lavergne gives a description of the species of *Glandina*, with their phical distribution and a list of 51 Mexican species; he mentions vious acclimatization experiments in France and the recent ex- nts of Prof. Bouvier and Prof. Berthier, and refers to various ob- ons made in France and Mexico on the habits of *Glandina*.

The Caterpillar Pest of the Mokameh "Tal" Lands (2).

DOUSE, E. J. and FLETCHER, T. BAINBRIGGE in *The Agricultural Journal of India*, VII, Part IV, pp. 343-354 + 2 maps and 1 fig. Calcutta-London, 1912.

r the last fifteen years or so the winter crops on about ten thousand of «Tal» land near Mokameh, on the southern bank of the Ganges atna, have been destroyed annually by *Agrotis ypsilon* caterpillars. lands are flooded during the rains (June to September) to a depth

(1) See also No. 1369, *B.* Sept. 1912. (*Ed.*).
(2) See No. 83, *B.* Jan. 1913. (*Ed.*).

of 5 to 15 ft., and are ploughed and sown as soon as the water r
The moths are apparently attracted to the wet mud, and lay the
there; the larvae attack the crops as soon as these spring up, rapi
creasing in numbers until the whole crop is totally destroyed. Th
chiefly sown are «masur» (lentil) and «khesari» (*Lathyrus sativus*), wit
peas on the higher lands. This damage was reported in 1909, but the
lars had then already increased to such an extent that no remedial m
were of avail. In 1910 trials were made of handpicking, which was
dered efficient if properly organised. In this year practically a normal
of damage was done. In 1911 systematic handpicking of the cate
was adopted as soon as they appeared, and over sixty thousand early
were thus destroyed before the middle of November. Trial was also
of the moth-traps produced by Messrs. Andres Maire et Cie., Alex
and containing «Prodenine», an attractive liquid specially produ
destroy the moths of *Prodenia litura* (*littoralis*), whose caterpillars
cotton in Egypt. Over two thousand female *Agrotis* moths were
in one trap during November. As a result of these measures it is e
that over six thousand acres of crops were saved. Further and ex
trials of these traps and of hand picking will be made,

194 – Notes on Insects injurious to Cotton in South Africa.

MOORE, W. in *The Agricultural Journal of the Union of South Africa*, Vol. IV, N
714-720, 1 plate. Pretoria, November 1912.

Of late years, the cotton crops of South Africa have been m
jured by insects; in some cases the loss has been as high as 75 pe
or more.

From his recent observations, the writer describes the species
ful to the cotton plant and the methods of control which are at p
in use.

The most important pests are *a*) the spiny cotton-boll worm (
insulana), known in the Sudan as the "Egyptian cotton-boll w
and in India as the "spotted cotton-boll worm" (1); *b*) the co
cotton-boll worm (*Heliothis armiger*), which often attacks peas, w
is known as the "pea worm," but also injures roses, carnations
the young fruit of peaches, apricots, apples, plums, nectarines, to
(tomato-worm), tobacco (tobacco-worm), maize (mealie-cob bore
the mealie-stalk borer); *c*) the cotton stainer (*Dysdercus nigrofas*
(2); *d*) the dusky cotton bug (*Oxycarenus laetus*); *e*) the cotton
(*Pulvinaria jacksoni*); *f*) the cotton aphis (*Aphis gossypii*).

Besides the above-named insects, which are the most serious
pests so far noticed in South Africa, the cotton leaf roller (*Sylepta*
gata) (3) should be mentioned, also a species of leaf bug of the
Capsidae, the green stink bug (*Nezara viridula*) and the black-a
stink bug (*Atelocera stictica*).

(1) See No. 3048, *B.* Aug.-Sept.-Oct. 1911.
(2) See No. 1975, *B.* June 1911.
(3) See also No. 656, *B.* April 1912.

Conorrhynchus luigionii and Lixus junci destructive of Sugar Beets in Campania, Italy.

ucci, Romolo. Alcune notizie intorno a due Cleonini, *Conorrhynchus Luigionii* Solari *Lixus junci* Boh. (*Coleoptera-Curculionidae*), dannosi alla barbabietola da zucchero lla Campania. — *Bollettino del Laboratorio di Zoologia Generale e Agraria della R. Scuola Superiore d'Agricoltura in Portici*, Vol. VI, pp. 26-42, plate I. Portici, 1912.

The damage done to sugar beets in Italy by *Conorrhynchus luigionii* Solari was observed for the first time during the spring of 1906 ime fields in Campania, whence in the space of a year this beetle id throughout the neighbourhood. *Conorrhynchus luigionii*, in the state, devours with surprising voracity the leaves even of the young-lants and in the larval form it destroys the pulp of the root.

Lixus junci Boh. appeared contemporaneously with the above men-d pest in the sugar beet fields of the same district, and spread there rapidly. This is due partly to the fact that it is able to fly and part-its practice of attacking garden plants besides sugar beets. The chief y is caused by this beetle when the beets begin to germinate, since emales deposit their eggs at this time in holes, which they excavate their rostra in the stalks of the plants. Nearly all the beets thus cked die, being actually cut in two. Other eggs are laid along the s of the leaves when the plants have developed well. The larvæ, as as they hatch out, excavate long galleries in the roots, gnawing away od deal of the pulp.

As a means of controlling both these beetles, the writer especially mmends seeking out the adults in their hiding-places : under stones lods, in crevices of the soil and under leaves, thus entirely freeing ields from these pests. As a supplementary measure only, the leaves e beets may be treated with insecticides (different solutions of ar-salts ; with a 4 or 5 % barium chloride solution ; arsenite of sodium 5 % with the addition of 10 lbs. of flour to every 100 gallons of so-n to make it stick ; carbon disulphide ; arsenate of lead from 1 to %; copper arseno-acetate at 0.15 %).

Insect Parasites of *Atriplex hortensis*.

ioel, Paul. : Les ennemis de l'Arroche. — *Bulletin du Laboratoire régional d'Entomologie Agricole*, First Quarter 1913 (Jan.-March), pp. 6-8. Rouen, 1913.

The writer enumerates the numerous insect parasites of this kit-gardèn plant.

Coleoptera : *Mecaspis fasciatus* Müller, *Cassida margaritacea* Fb., *nebulosa* L.

Hemiptera : *Aphis papaveris* Fb., *A. atriplicis* Fb., another undeter-ed species of Aphis, two undetermined Psyllids, *Trioza atriplicis* nt.

Lepidoptera : *Arctia caja* L., *Hadena aleracea* L., *Agrotis ianthina* , *A. fimbria* Hb., *A. sigma* Hb., *A. plecta* Hb., *A. putris* L., *A. ripae* , *Caradrina superstes* Tr., *Mycterophus punicea* God., *Mamestra pere-* Hb., *M. chenopodii* Hb., *M. suasa* Hb., *Hadena atriplicis* Hb.,

Hydroecia micacea Esp., *Calocampa exoleta* L., *Brotolomia meticulosa* *Eupithecia subnotata* Hb., *Cidaria chenopodiata* S. V., *Gelechia nanciya* Dup., *G. atriplicella* F. R., *G. obsoletella* F. R., *G. hermannella* Fb., *Hy dines roesella*, *Coleophora unipunctella* Zell., *C. binotatella* Zell., *C. fu ginella* Ill., *C. annulatella* Tenst., *Butalis chenopodiella* Hb., *Spe tophthora hornigii* Led., *Goniodoma auroguttella* F. R., *Pterophorus rodactylus* L., *Coleophorus stephanii* Joannis and one undetermined sp

Diptera: *Pegomyia hyosciami* Macq., *Asphondilia conglom* Stefani, *A. punica* Marchal, five undetermined Cecidomyids, *Stefani trinacriae* Stefani, *S. atriplicis* Kieff., *S. brevipalpis* Kieff.

Acari: *Eriophyies heinii* Nal., *E. brevipes* Nal., and one undetermi species of *Eriophyies*.

197 – Enemies of the Spinach.

NOEL, PAUL.: Les ennemis des Epinards. — *Bulletin du Laboratoire régional d'Ent logie agricole*, First Quarter 1913 (Jan.-March), pp. 13-14. Rouen, 1913.

A list of the parasites of this kitchen-garden plant:

Lepidoptera: *Arctia villica* Hb., *Amphipyra tragopogonis* L., *Hy dines roesella* L.

Nematoda: *Heterodera schachtii* Schmidt, *H. radicicola* Greeff.

Fungi: *Peronospora effusa* Grev. (1).

198 – The Elegant Grasshopper.

The Agricultural Journal of the Union of South Africa, Vol. IV, No. 5, pp. 753-755. toria, November 1912.

Zonocerus elegans, the Elegant Grasshopper, known to many far as the "stinksprinkhaan," causes much damage every year in many p of South Africa. In 1911, it was unusually abundant in parts of Cape Province and of the Transvaal.

The insect is especially troublesome in gardens and orchards is particularly fond of fruit and will attack almost any kind of veget even including onions.

As the elegant grasshopper does not move in swarms, nor mig far, its control is a local matter and its presence is little regarded by Central Government.

Many insecticides have been used for its destruction, but the re have not always been satisfactory, owing to the dangers to plants cattle which are incurred by their employment.

The most practicable way so far known of dealing with the in gardens, appears to be the collection of the young grasshoppers in (similar to butterfly-nets but of stouter material), or in an improv bag. The insects should then be turned into a vessel containing a sl quantity of paraffin floating on water. Thousands may be caught killed in a few minutes in this manner.

(1) See No. 579, *B.* March 1912 and No. 70, *B.* Jan. 1913.

The Green Oak Tortrix in Italy.

CECONI, GIACOMO. La Tortrice delle querce in Italia (*Tortrix viridana* L.) *Bollettino del Laboratorio di Zoologia Generale e Agraria della R. Scuola Superiore d'Agricoltura Portici*, Vol. VI, pp. 308-319, figs. 1-6. Portici, 1912.

In 1911 for the first time a slow and continually increasing destruc- of the oak leaves due to the attacks of the larvae of the Green Oak ix (*Tortrix viridana* L.) was observed in the oak woods of some dis- of Venetia, Romagna, Tuscany and the Marches. In 1912, the attack epeated and with still more serious results.

s insect, which is widely spread in Central and South Europe, Fin- South Sweden and Norway and in Asia Minor, had hitherto only observed in North and Central Italy; but according to the data ted by the writer, it is equally common in the South.

ig. Cecconi gives a systematic description of the species, followed me biological notes. The moth appears in Italy from the 20th of to the 20th of June. The female lays its eggs around the buds, their vicinity; the eggs survive the winter and only hatch out in ring, when the larvæ begin to devour the leaf and floral buds, and ttack the young foliage, of which they only leave the veins, fastening together with silky threads. When the larvæ are full-grown, levour the other leaves, only sparing a fragment here and there at- l to the principal nerves. The leaves, or rather leaf-fragments, are ed together and rolled, thus forming a shelter for the caterpiller ; its moult. When about a month old, the caterpillar pupates i this envelope.

he trees of an entire forest may be completely defoliated by these dllars, which sometimes devour even the axes of the catkins, which nd also the peduncle and base of the young acorns. This causes, the death of the tree, at least a hindrance in its development and in that of the wood, and brings about the loss of the fruit.

he measures of natural control which are most recommended are rotection of the insectivorous birds found in oak-woods (tits, war- finches, etc.) together with the protection and diffusion of the natu- rasites of the pest. In 1911, the writer succeeded in breeding var- Hymenoptera (seven Ichneumonids, one Braconid, two Chalcids), ree Diptera. The writer comes to the conclusion, from his exam- n of the material received in 1912, and from comparing the results s year's breeding with those of 1911, that at present the Ichneu- s (and especially *Pimpla maculator* F.), which are the commonest tes, are only found in Venetia. In Tuscany, on the other hand, are Braconids and Chalcids, as well as some Diptera. No parasites obtained from the material from the Marches, which however does ove their absence in this district. If the Ichneumonids were num- in the forests of Venetia, they, as well as the Braconids, Chalcids Diptera, might with advantage be transported to other districts. rtificial remedies have so far proved practically useless.

200 - ***Rabdophaga saliciperda* damaging Willows in Italy.**

CECCONI, GIACOMO. La Rabdofaga distruttrice dei salici in Italia (*Rhabdophaga saliperda* Duf.). — *Bollettino del Laboratorio di Zoologia Generale e Agraria della R. Scuola superiore in Portici*, Vol. VI, pp. 320-330, figs. 1-3, plate II. Portici, 1912.

The Willow-wood Midge (*Rhabdophaga saliciperda*) was discov in 1841 in France, Austria and Germany. The writer was the fir record its occurrence in Italy — in the Province of Florence, in on *Salix alba* L. Outside Italy, this midge attacks other species of lows and also *Populus alba* L.. It is injurious only in its larval condi when it tunnels into the wood of young trunks and branches. At the cortex of these portions remains intact and of the same colour as affected parts, while the exterior has an irregularly undulating, n milated appearance. Gradually the colour of the cortex changes, coming a reddish-brown, and slight longitudinal cracks appear. cortex continues splitting longitudinally, and when the time for swa ing comes, it appears completely perforated, becoming continu darker; then it dries up and gradually becomes detached, and the ments fall to the ground. Thus the cavities made by the larvæ ar posed to view, and the wood assumes a blackish colour.

In the meantime, the tree has begun to react, forming a cica all round the zone occupied by the cavities of the larvæ. As, how the females prefer laying their eggs around the injured zone, the truction continues in the second, the third, and even the fourth provided the trunk and branches are of a sufficient size. In this the affected zone extends in length and width, so as to almost compl encircle the trunk, or branch, which then breaks off at this p The upper portion of the larva-infested zone withers very soon, so the thin stems and the branches break off directly after the first a cond year's attack.

So far, no parasites of *Rhabdophaga saliciperda* had been mentio but the writer, in three years' consecutive breeding, obtained five longing to the Hymenoptera (*Platygaster* sp., *Eutelus* sp., *Tridymus* sp., *Torymus tipulariarum* Zett. and *Eurytoma* sp.), which will be cribed in another work.

As a remedy against the midge, it has been recommended to c the infected parts of the tree with a viscous substance, so as to pre the exit of the pupæ and the adult insects. The infected parts may be cut off and burnt.

According to the writer, use can be made of the five above-mentio parasites and especially of *Torymus tipulariarum*, which increased much from 1910 to 1912, that it alone destroyed 60 per cent. of the væ of the midge in some trunks and branches.

An Insect Pest of the "Currajong" (*Brachychiton*).

ewen, C. Junr. in *The Journal of the Department of Agriculture of Victoria, Australia*, X, Part 11, p. 662, 1 plate. Melbourne, November 1912.

he "Currajong" (*Brachychiton populneum* R. Brown = *Sterculia ifolia* G. Don), is much cultivated in Victoria (Australia) as an ental tree in large private gardens, public parks and avenues, In times of drought, in some parts of the interior of Australia g stock have been saved by eating the leaves of these trees and e roots, if they happened to be exposed.

Psyllid, *Tyora sterculiae* Froggatt, attacks the leaves of the ajong," which causes them to become discoloured and spoils the ance of the trees themselves. The parasite was first discovered rbes, New South Wales.

he most effective means of dealing with this pest is to spray the with kerosene, or benzol emulsion, pine oil spray, or any other e which kills insects by contact.

RUGGERI ALFREDO — *Gerente responsabile.*